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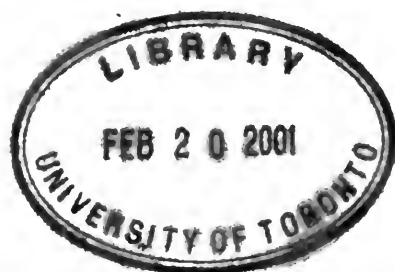
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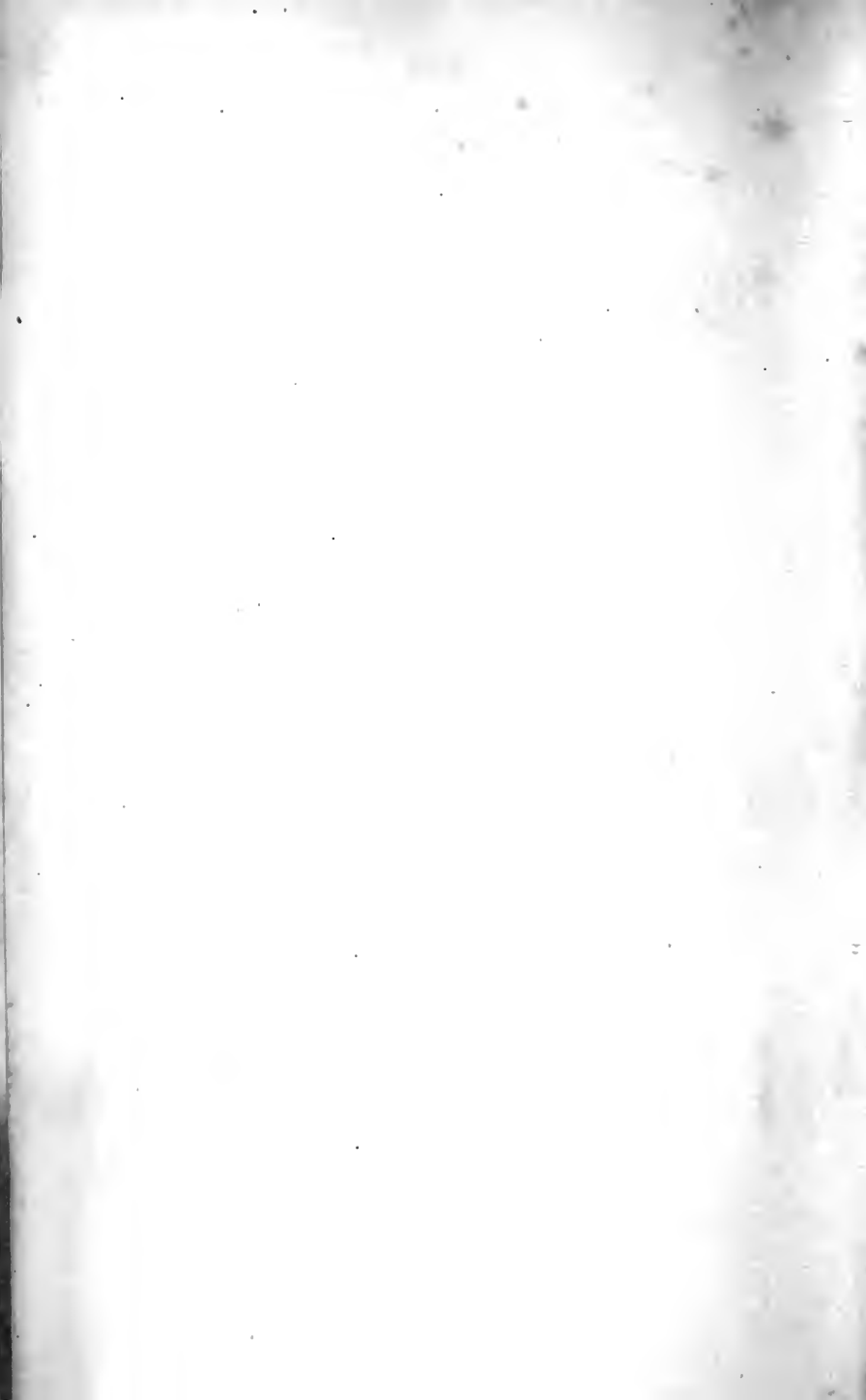
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THE
A M E R I C A N
JOURNAL OF PHARMACY,

PUBLISHED BY AUTHORITY OF THE
PHILADELPHIA COLLEGE OF PHARMACY.

EDITED BY

WILLIAM PROCTER, JR.

PROFESSOR OF PHARMACY IN THE PHILADELPHIA COLLEGE OF PHARMACY.

GERRARD ST
TORONTO.

PUBLISHING COMMITTEE FOR 1863.

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VOLUME XXXV.

THIRD SERIES, VOL. XI.

PHILADELPHIA:
MERRIHEW & THOMPSON, PRINTERS,
No. 243 Arch Street, below Third Street.
1863.

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JANUARY, 1863.

HISTORY OF THE ORGANIC RADICALS.

By M. AUGUSTE CAHOURS.

A Lecture delivered before the Chemical Society of Paris, March 30th, 1860.

Translated from the French, by W. S. W. RUSCHENBERGER, M. D., U. S. N.

Gentlemen: I propose to set forth in a summary manner in this lecture the history of organic radicals, the study of which, though dating back scarcely thirty years, has produced fruitful results, and contributed largely to the development of organic chemistry.

We give the name of radicals to particular compounds, whose complex nature may be rendered evident by the aid of physical forces, or by the intervention of reagents; but which, though formed of many elements, present the characters of simple bodies and exercise functions precisely similar. They are, in a word, compounds, which possess the property of forming with simple bodies, combinations entirely analogous to those which the latter produce by their mutual union.

Among the radicals some are known in the isolated state; these may be handled and made to combine and to separate under influences which enable us to make and unmake chemical compounds of most varied character, such as cyanogen, cacodyl, stibethyl, &c.; but the greatest number, it must be admitted, have only a purely hypothetical existence. Among the latter are methyl, ethyl, acetyl, benzöile, ammonium, &c.

By grouping the different organic compounds into families or determinate series of which each includes a fixed nucleus or radical, a kind of pivot around which all bodies of the group turn, their study has been considerably simplified, rendering them both more advantageous and philosophic. Thus in the

alcohol derived from wine, the ether of pharmacy, and the different compound ethers, chemists have admitted the existence of a fixed group,



analogous to potassium, although up to the present time we have been unable to isolate a product presenting this composition, which would be capable of forming ordinary ether by its direct union with oxygen, or of engendering chlorohydric ether, by combining it with chlorine. By causing zinc to act on iodohydric ether in closed vessels at a temperature of from 140° to 150° [centigrade,] M. Frankland separated iodine in the state of a metallic iodide, and was enabled to collect a compound gas formed of 4 eq. of carbon+5 eq. of hydrogen.

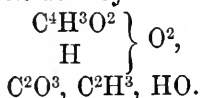
But this, the formula of which it is necessary to double in order to place its equivalent in harmony with those of all well defined compounds, although offering us in reality the composition of the product designated under the name of ethyl, presents none of the characters which a radical should possess.

Placed in the presence of chlorine, far from reproducing chlorohydric ether, as we should expect, it furnishes, as is observed in different hydrogenous compounds, a product derived by substitution. Oxygen, in whatever condition it may be made to intervene, will not effect its conversion into ordinary ether. I would say as much of the product obtained in treating benzöine by chlorine, a compound which Laurent considered as the radical of benzöic combinations, as the true benzöile, as well as of the other isomeric, the formation of which has been indicated in the dry distillation of the benzoate of copper.

If then we study attentively these diverse groupings which have been regarded as radicals, we shall not be slow to perceive that only a very small number of them satisfy the conditions, which similar products ought to satisfy, namely: to beget by their union with certain simple bodies clearly definite compounds, from which they might be afterwards separated perfectly intact. If we see certain groupings, which we suppose to constitute the nucleus of a given substance, pass into the numerous compounds it is susceptible of forming, or into different derivatives which contact with reagents may produce, that is not sufficient evidently to range them in this group of bodies; such are

ethyl, benzöile, &c., of which we spoke before. Certainly the study of all these bodies is most instructive, and it will not be denied that to the profound examination of these questions, organic chemistry is indebted for the great strides it has made in latter years, so much have observers multiplied experiments to elucidate them; nevertheless, it seems to me more suitable in the actual state of science, to consider as radicals only those singular substances, which, taken in a pure state, behave in the manner of simple bodies.

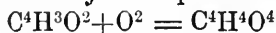
Such definite grouping appears to us most frequently as a radical, only according to the particular view we take, or according to the metamorphoses determined by the reagent we employ. Thus if we consider the formation of acetic acid by the oxidation of alcohol, or, better, of aldehyd, we are led to regard this product as the oxide of a ternary radical which we designate under the name of acetyl, but if we base our view upon the decomposition which this same acid undergoes on the part of alkaline bases, at elevated temperatures or on the separation which electrolysis effects in it, we are naturally brought to trace its derivation to the reciprocal action of carbonic acid, and the grouping C^2H^4 , which is nothing but marsh gas. From this we might express the constitution of acetic acid by the aid of the formulæ,



both of which satisfy clearly definite reactions.

It is now known that acetic acid may be produced, either by the direct oxidation of aldehyd, or the decomposition of the chloride of acetyl by water, or by the contact of carbonic acid with *kalimethyl* or *natrimethyl*.

It is what is expressed by the equations



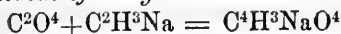
H

Aldehyd. *Acetic acid.*



Cl.

Chloride of acetyl. *Acetic acid.*

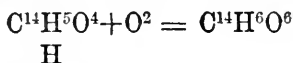


Natrimethyl. *Acetate of soda.*

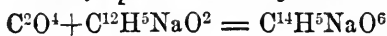
It would be the same with all the acids of the acetic group.

Now, whatever may be the veritable constitution of these different acids, of which we are entirely ignorant in the present state of science, there remains no less knowledge of them, on account of the close analogies which connect these bodies to each other; if we had just discovered the real constitution of one of them, we should easily understand that of others, and there is consequently a very great advantage in arranging them in the same series, a knowledge of all flowing from that of a single one.

I would say as much of salicylic acid and its homologues, this acid being as readily obtainable by the oxidation of the oil of spiræa as by the action of carbonic acid upon the phenate of sodium. In fact, we have



Oil of spiræa. Salicylic acid.



Phenate of sodium. Salicylate of soda.

In place, then, of regarding aldehyde and oil of spiræa as hydrurets of ternary radicals, acetyl and salicyl, which we have been unable to seize, and, consequently, acetic and salicylic acids as oxides of these radicals, is it not more simple to consider them, with M. Dumas, as types in which we may, by the aid of double decompositions, effect a series of regular substitutions, without destroying their equilibrium, without modifying their mechanical grouping. We find ourselves in this way brought back to the equivalent compositions of M. Chevreul, which, prejudging nothing, permits the observer to try such reaction as may appear to him realizable from his point of view; these equivalent compositions presenting besides the great advantage of offering us a register by which to verify our analyses or permitting us to seize upon relations which without them would remain unperceived.

We will, therefore, restrict the name radical to compound bodies which, taken in the free state, such as cyanogen, cacodyl, stibethyl, and their analogues, &c., possess the characters of true simple bodies playing sometimes the part of an electro-negative

element or supporter of combustion, sometimes that of an electro-positive element or combustible.

I propose to examine only those in this lecture, not that I think that some of these hypothetical bodies may not be isolated at some future time, but because it appears to me more suitable to consider such only as it is possible to obtain in a free state.

This stated, I will now endeavor to demonstrate the simple idea I entertain of the part played by these curious bodies, however singular it may appear at first, and which seems to me to be naturally derived from the law of chemical combinations.

If we place in presence of each other two elements, endowed with a mutual affinity in greater or less degree, they will be evidently attracted one towards the other, and will give rise to compounds the most diverse, manifesting certain physical phenomena, such as the development of electricity, of heat, and sometimes of light, the intensity of which will depend upon their degree of affinity. Be this as it may, these bodies are incapable of uniting in all imaginable proportions, and daily experience demonstrates in the most evident manner that in this contact, however varied may be the circumstances under which it is effected, they can never form but a very limited number of combinations. If the affinities which solicit these bodies are very energetic, they form at most two or three compounds, most commonly only one, and these always oppose great resistance to decomposition. The manner in which hydrogen and the alkaline metals behave with chlorine; the products which result from the contact of charcoal, of boron, of silicium, &c., with oxygen at high temperatures, demonstrate it sufficiently. On the contrary, bodies which have little tendency to unite when placed in presence of each other, form numerous, but always unstable compounds. To enable us to be understood, we think it is enough to refer to the history of the oxygenated compounds of chlorine.

In every case, whatever may be the number of compounds which two simple bodies may be susceptible of forming by their mutual union, there is always one which possesses greater stability than the others, and towards which they all converge.

But the greater or less stability of such group is evidently only relative to the special circumstances under which its formation is effected. Hence, whenever we place in very determinate conditions the different compounds which two bodies have produced by their mutual union, they constantly assume the particular form which is alone possible in these conditions. We all know, for example, that of all the compounds which phosphorus is susceptible of forming with oxygen, the most stable is phosphoric acid. Under special influences phosphorus may be united to this gas in other proportions, but all these different compounds converge towards this group under the influence of high temperature. Acted upon in the presence of free oxygen, there will be a fixation of a certain quantity of this gas. Acted upon in closed vessels, there will be a separation of a certain quantity of phosphorus. In all cases, whenever phosphorus does not assimilate the proportion of oxygen necessary for its transformation into phosphoric acid, it may be always brought back to this form, or substituted in place of a portion of this oxygen, other simple bodies, such as of chlorine, bromine, sulphur, &c., so as to produce the compounds known under the names of chloroxide, bromoxide, and sulphoxide of phosphorus, which, the same as phosphoric acid, belong to the group

$$\text{PhX}^5.$$

In a word, when we place in presence of each other two simple bodies, susceptible of uniting under determinate conditions, and of giving rise to many definite compounds, we observe that there always exists a state of saturation which possesses an equilibrium that it is impossible to exceed. As long as this state of equilibrium is not attained, we may add to the first body a new proportion of the second until saturation is effected.

There are certain bodies which, by uniting with another, yield very stable products which, not having reached the point of saturation, have a tendency to combination quite as great and sometimes even more energetic than the simple bodies themselves. Such are carbon, sulphur, and nitrogen; oxide of carbon, sulphurous acid and binoxide of nitrogen, being susceptible not only of absorbing new quantities of oxygen with greater facility than the simple bodies which they contain, but of also

uniting with chlorine and iodine, to form compounds corresponding to those which are at the maximum of oxygenation. These very stable groups, which may be made to enter into definite compounds, to be afterwards separated from them without undergoing the slightest alteration, and those alone which thus present the fundamental properties of simple bodies, truly merit the name of radicals.

We may easily conceive the sensation produced by the discovery of cyanogen, which, so long as it is not altered in its elementary constitution, presents in a faithful manner the most prominent properties of chlorine and its congeners. We can now give a very clear account of the remarkable functions of cyanogen in setting out from combinations with nitrogen.

Every compound may be considered as a molecular system in equilibrium in which the atoms are attracted towards each other in virtue of more or less powerful affinities. If we replace one or more atoms of one of the elements of the compound by an equal number of atoms of another substance, we obtain a new compound which will present the same mechanical grouping as the primitive product, but whose state of equilibrium within extended limits, is accordingly as the reciprocal attractions of the bodies which constitute the new substance shall be more or less energetic than those of the primitive bodies. Ammonia being susceptible of exchanging all or part of its hydrogen for chlorine, bromine, iodine, carbon, cyanogen, ethyl, the metals, &c., should necessarily form, by means of these substitutions compounds belonging to the same system, but presenting the most diverse conditions of equilibrium; this is demonstrated in the most evident manner by experience.

It is thus that although ammonia resists a dull red heat, we clearly understand that chloride of nitrogen may be instantly destroyed, not only by the effect of temperatures below the boiling point of water, but under the influence of the slightest disturbance, the affinities which solicit chlorine and nitrogen being incomparably weaker than those which unite the latter to hydrogen.

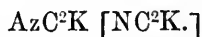
If now we remove an atom from the primitive group without replacing it, and if the new combination which results from this elimination presents a certain stability, it may fix anew the atom

of the substance eliminated, to reproduce the primitive body or an atom of any other simple body to produce compounds of the same type; the compound formed under these circumstances will act from that moment as a true radical. Let us pass a current of dry ammoniacal gas over charcoal arranged in a porcelain tube brought to a red heat, two atoms of hydrogen will be eliminated, two atoms of carbon will take their place, and we shall obtain cyanhydric acid, a compound the grouping of which corresponds to that of ammonia, but whose properties are very different, as may be readily conceived, the chemical functions of carbon being very different from those of hydrogen.

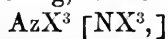
By its reaction upon the oxides of mercury or silver, cyanhydric acid thus produced will give rise to the formation of cyanurets which will not differ from it except that the molecule of hydrogen will be found replaced in it by a molecule of metal, silver or mercury, but the fundamental characters will be still evidently the same. If we now subject these cyanurets to the action of increasing temperatures, a moment will soon arrive when equilibrium is no longer possible, and we shall see a separation into a metal which will remain as residue in the distillatory apparatus, and a gas, the composition of which is expressed by the formula.



This gas is no other than cyanogen, which to enter into the ammonia type has but to *fix* an atom of different simple bodies, playing in respect to them sometimes the part of an electro-positive element, as in cyanic acid and chloride of cyanogen, and sometimes the part of an electro-negative as in cyanhydric acid and the cyanurets. This cyanogen which just now could not exist in combination with mercury or silver at a dull red heat, on account of its feeble affinity for those bodies, when heated under a bell glass with potassium, manifests vivid ignition, giving rise to the compound



belonging, like the preceding, to the type



but this time capable of resisting very high temperatures. If cyanogen thus perfectly simulates the characters of a true simple body, it is evidently due on the one hand to its considerable

stability, and on the other to its tendency to produce combinations at the maximum of saturation which are themselves very stable, by assimilating a molecule of some simple body to enter again into the primitive type from which it was derived. The part of cyanogen as a radical, as a body acting in the character of an element, is so explained in a most satisfactory manner; we shall see that the same is true of various products known under the name of radicals.

When we place a simple body, metal or metalloid, in presence of oxygen, it forms with this gas, as we have seen, definite compounds in various numbers; replace the oxygen by chlorine, bromine, sulphur, &c., and we beget compounds represented by parallel formulæ; now experience shows, that adopting suitable processes we can form with this same body and methyl, or any one of its homologues, products whose composition is entirely comparable. Methyl or its homologues united to electro-negative bodies which are at the top of the scale of simple bodies, (oxygen, chlorine, bromine, iodine, &c.,) yield very stable compounds, which possess perfect neutrality. In proportion as we descend the scale, and advance towards potassium which forms the lowest point of it, we obtain products whose affinity for simple bodies which occupy its superior extremity goes on increasing to such a point that, when it reaches the group of alkaline metals, there is a dislocation of the molecule and formation of very simple and consequently very stable products.

If we unite methyl with the intermediate bodies we shall obtain compounds that still possess a great affinity for oxygen, chlorine, &c., and consequently capable of forming with these bodies clearly definite compounds whose stability is such that they may be completely separated from them intact. In this way may be produced bodies comparable to cyanogen, at least as long as the proportion of methyl or of ethyl which enters into the composition of these products represents the term of saturation, in which case, it is believed, the molecule is entirely inert to enter into combination.

When a simple body A forms with another simple body B, several compounds, whose term of saturation is represented by the formula

AB x .

(x being a whole number always very simple,) experience demonstrates that we may form with this body A and the different alcoholic radicals compounds at different states of saturation. As long as the number of molecules of the alcoholic radical which enters into the compound is inferior to x , the new compound can be united to oxygen, to chlorine, to iodine, &c.; if it is also susceptible of separating intact from these combinations under the influence of agents endowed with preponderating affinities for these simple bodies, it will behave as a true radical, being able to absorb a greater number of atoms of oxygen or of chlorine in proportion as the number of equivalents of ethyl which it may contain shall be smaller. Experience teaches in like manner that, in proportion as the number of equivalents of the alcoholic radical which unites with A goes on increasing, the resulting compound is endowed with affinities for oxygen, chlorine, &c., more and more energetic, the oxygenated compounds, however acid or neutral they were primitively, advancing towards alkalinity in the most decided manner.

Arsenic presents us in this respect a most striking and instructive example. This body tends to form two principal groups,

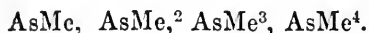


and

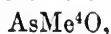


the last presenting the term of saturation.

We may then form with arsenic and methyl at a maximum five definite compounds, the last being incapable of producing new compounds, because it is at saturation. Now, the experiments of Bunsen, of Landolt, of Baeyer and my own, demonstrate that we may form with arsenic and methyl the four compounds



If we place these different compounds in presence of an excess of oxygen so as to obtain compounds at saturation we shall have



which form with water the following compounds :

$\text{AsMeO}^4 2\text{HO}$ bibasic acid,

$\text{AsMe}^2\text{O}^3\text{HO}$ monobasic acid,

AsMe^3O^2 indifferent body,

$\text{AsMe}^4\text{O}, \text{HO}$ powerful base, comparable to potassa and soda.

The oxygenated compound which forms the superior term presenting the characters of a very energetic acid, we see that the last possesses such alkalinity that it may rival the most powerful bases.

Azote [nitrogen,] like arsenic, is susceptible of giving origin to five perfectly definite groups which may be formulized in the following manner :



These five groups which are of the greatest interest may be realized with oxygen. We are also acquainted with compounds containing both oxygen and other elements, such as chloronitrous and chloronitric acids which may be obtained by the direct union of chlorine with binoxide of azote [nitrogen] compounds which correspond to nitrous and hyponitric acids.

Contrary to what is observed with oxygen we have been able to isolate but a single definite hydrogenated compound of azote [nitrogen.]

This compound, which is ammonia



corresponds to the group



We have previously seen how we may, starting from this product, produce the most diverse compounds by a series of regular substitutions. Ammonia, being endowed with basic properties, will beget bases by these substitutions, if we replace a part or all of its hydrogen by bodies whose chemical functions are analogous, while it will yield neutral bodies and even acids if we replace this hydrogen by bodies whose chemical functions are opposite.

Substitute, for example, in place of the hydrogen any one of

the radicals of the divers alcoholic series, phenyl or one of its homologues, &c., we obtain products which present not only the most complete parallelism of composition, but whose chemical characters are so confounded with those of ammonia, that the history of these various compounds is deduced from that of the substance itself. This result is easily explained when we reflect that the chemical functions of these carburets of hydrogen much resemble those of hydrogen; but what is very worthy of attention is that the alkalinity of these compounds increases with the number of equivalents of methyl, of ethyl, &c., which have been substituted. This observation becomes more striking still when we consider the compounds resulting from similar substitutions effected in phosphuretted hydrogen.



The trimethylphosphine PhMe^3

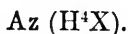
and the triethylphosphine PhE^3 ,

which differ as we see from this gas only by the substitution of 3 equivalents of methyl or of ethyl for 3 equivalents of hydrogen, possess the property of combining with different acids, but this is not the case with phosphuretted hydrogen which unites only with iodohydric acid, a compound so unstable that the slightest influences are sufficient for its destruction.

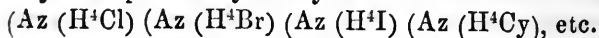
If we have been unable up to this time to form of nitrogen and hydrogen, a compound corresponding to the maximum of saturation,



we nevertheless know a great many which may be considered as belonging to this type, which are comprised in the general formula.



It is thus that dry ammoniacal gas, like a great number of carburets of hydrogen, directly unites, volume to volume, with chlorohydric, bromohydric, iodohydric, cyanhydric; etc., gases, to form compounds which enter in the preceding formula and which may be expressed by the symbols



(To be continued.)

ON COPAIVA PILLS.

BY JNO. M. MAISCH.

Copaiva has been known and employed in medicine for about two hundred years; its use in the various stages of gonorrhœa, however, is not nearly as old, and dates back only to the latter half of the eighteenth century. It has been for a long time given in the pure state, swimming upon water or mixed with a sufficient quantity of sugar to disguise to a certain extent its disagreeable taste. Its property of being emulsioned by the yolk of eggs and by mucilage of gum arabic, was afterwards considered quite a progress, as it was possible to cover and modify the odor and taste to a great degree by the addition of aromatics, ethers and bitter medicines.

For a long time it was considered nearly impossible to obtain a combination of copaiva possessing sufficient adhesiveness to allow its exhibition in the form of pills. This difficulty is owing to the larger quantity of volatile oil which is present in this natural oleo-resin, a good copaiva containing from 30 to 50 per cent. of it. This carbohydrogen is most probably the principal, if not the only active ingredient of copaiva, the medicinal activity of the hard resin, the copaivic acid, being according to the observations with which I am acquainted, nearly destitute of any beneficial effects in the diseases for which copaiva is employed. It would therefore appear, that with the increase of the proportion of the volatile oil, copaiva must become more valuable as a medicine. The largest quantity of volatile oil was observed by Ulex of Hamburg in 1852, in which year a copaiva was imported at that place from Para, containing only 10 per cent. of resin, having a specific gravity of .928 and being, notwithstanding, not nearly as thin as might have been expected. (Archiv d. Ph. 1853, Jan.) Prof. Procter found 80 per cent. of volatile oil in a Para copaiva. See Am. Journ. Ph. 1850, 292.

The first attempts for the formation of pill masses containing copaiva as their principal ingredient, were made with vegetable powders and mucilage. With great difficulty a mass may be formed and divided into pills, but it is the nature of the volatile oils to gradually sweat out upon the surface, causing the pills, to become sticky, and to fix upon them much of the powder in

which they are kept ; thus the pills will increase in size; or on the other hand, if the powder possesses little adhesiveness, like lycopodium, it will absorb the exuded oil and the pills will become proportionately weaker.

Such vegetable powders which are very absorbent, are best adapted for the formation of proper pill masses, and powdered marshmallow and liquorice root would deserve attention in this respect, if thereby the bulk of the medicine was not so largely increased. The Pharmacopœias of Hamburg and of Slesvic-Holstein direct equal weights of copaiva and althæa powder to be formed into two grain pills, so that from 15 to 30 pills would constitute a dose. Augustin in his *Pharmacopœia extemporanea*, Berlin, 1822, directs equal weights of powdered gum arabic and rhubarb with a sufficient quantity of copaiva, to be made into four grain pills; aside from the variable quantity of copaiva necessary for obtaining a proper pill mass, the gum arabic cannot in this case be considered an excipient, as it will absorb much less oil than the rhubarb and the above two powders, and because it will not impart the least adhesiveness to the mass, unless Geisler's suggestions, made in 1840, are followed, and the gum arabic is used, not in the form of powder, but as a thick mucilage; the addition of an absorbent powder will serve then a good purpose. The following formula has been in use in the Hôpital des Vénériens at Paris: *Copaivæ ʒij, Pulv. acaciæ ʒi; Pulv. glycyrrhizæ q. s., Aquæ q. s. ut ft. boli No. xx.* While each bolus contains only 6 grs. of copaiva, its size is very considerable and objectionable for this reason.

Many combinations have been suggested for forming copaiva into masses adapted for boli, which may be considered as less difficult to prepare, because a somewhat softer mass may be employed than for pills. But the use of conserves and electuaries for this purpose, which was first suggested, is by no means adapted, as the oily portion will soon separate, there being no proper emulgens present. Much better is the employment of absorbing powders, and if the nature of the case will admit, some astringent like catechu or kino, together with a thick mucilage as excipient. A tolerably good mass is obtained according to Pierquin's suggestion (*Mémorial Pharmaceutique*, Montpell. 1824,) by the use of soap, in the proportion of 8 to 5 of copaiva,

to which he advises the addition of powdered catechu in sufficient quantity.

Cadet de Gassicourt recommended in his *Formulaire magistral*, Paris, 1826, the addition of one part of magnesia to 21 parts of copaiva. This method of forming it into a suitable pill mass appears to have attracted but very little attention until Mialhe advised in the *Journ. de Chim. Méd.* Mars, 1828, the solidification of copaiva by the addition of 1-16th magnesia. The cause of this solidification was, I believe, first shown by Elias Durand to be the hard resin of copaiva, which from its properties, has received the name of copaivic acid. (See *Journ. of the Phil. Coll. of Pharm.* i. 3.) The combinations formed by this resinous acid in its pure state with the alkalies, earths, and metallic oxides, were studied by J. F. Gerber in 1829, his researches being published in *Archiv der Pharmacie*, vol. xxx.

A similar compound has been already recommended by Godefroy in the *Journ. de Pharm.* June, 1825, where he recommends the preparation of a soda-soap from copaiva, which, however, evidently contains but little of the volatile oil, it being partly expelled by the heat employed for effecting the combination.

A loss of volatile oil is likewise incurred by solidifying copaiva by Thierry's method, with freshly prepared hydrate of lime. (*Journ. de Pharm.* April, 1842). He uses 1 part to 15 parts of the oleo-resin and exposes the mixture to the temperature of a water bath for 4 or 5 hours, until the mass has assumed a pillular consistence; the loss he states to be one-eighth of the weight of the copaiva employed, which is by far too considerable to be overlooked, and it is even probable, that Para copaiva containing much volatile oil, must lose much more before a proper consistence is attained.

The solidification of copaiva with magnesia takes place in the space of a day or two, but requires occasionally several weeks, and sometimes even the evaporation of a portion of the volatile oil, which does not combine with bases. To overcome this difficulty it had been proposed to the Paris *Société de Pharmacie* to mix such a copaiva with 1-6th turpentine; it was even stated that if adulterated with 1-20th of castor oil, the addition of 1-5th of turpentine would cause it to solidify with 1-16th magnesia. In his report upon this subject, and upon the probable adulteration

of copaiva with turpentine, Guibourt (see Journ. de Pharm. xvi. 562, and Journ. of Phil. Coll. Pharm. iii. 39,) states that turpentine does not form a pillular mass with 1-16th of magnesia, but that it requires about one-eighth of this base, and that consequently turpentine cannot be used for promoting the solidification of copaiva, unless the magnesia is at the same time increased.

An increase of Mialhe's quantity of magnesia will likewise facilitate the hardening of copaiva. The Pharmacopœia Gallica of 1828, edited by Ratier and Henry, contains a pill mass made of equal parts of these ingredients; and Mohr, in Geiger's Pharmacopœia Universalis, gives the following direction for *Pilulæ copaivæ magistrales*: *R. Copaivæ unc. unam, Magnesiae ustæ drach. sex ad septem, f. l. a. pillulæ.*

Copaiva pills made by Mialhe's process are officinal in the United States Pharmacopœia. As the mixture hardens very slowly, and cannot be rolled into pills without their flattening, while the mass is still pliant at ordinary temperature, it is customary to keep the solidified copaiva on hand and form it into pills whenever needed. The application of a moderate heat is then necessary to render the more or less brittle mass sufficiently soft. But notwithstanding all the precautions adopted on the part of the pharmacist, these pills are almost always of a less elegant finish than all those which have adhesiveness imparted to them by an excipient which is not of a resinous nature. A change of temperature will either render them very brittle, or soften them and cause their flattening. But even aside from these considerations, it appears questionable whether these pills deserve a place in the Pharmacopœia among the permanent preparations.

Even if we admit that the copaivic acid is destitute of medicinal properties, and that copaiva, therefore, is not altered in its nature, simply by the admixture of some magnesia, it cannot be doubted that the volatile oil is gradually altered by continued contact with the atmosphere in the presence of a base. It is at least a property of most volatile oils, that their tendency to resinify is augmented by contact with alkalies. Solidified copaiva, as it occurs in commerce, possesses most generally but little odor and taste, and I have met with sugar-coated copaiva pills which were as tasteless as white wax or rosin. It appears

as if the commercial article was hardened by distilling off nearly all the volatile oil. So-called solidifiable copaiva contains but little volatile oil, but a large proportion of copaivic acid; for this reason alone it cannot be but less active than Para copaiva; if made into a mass with magnesia, it will be found to gradually become weaker in odor, and of a less pungent taste, and after some time the quantity of the volatile oil will be found to have materially diminished.

Physicians are aware, I should suppose, that the officinal copaiva pills, when old, are by far less reliable than copaiva itself; but I think the fault has been more generally ascribed to the form of the medicine or to the presence of the resin soap than to the causes as above stated, which appear to me the rational ones. I have always observed, and been informed on inquiry, that copaiva is used in considerable quantities in the form of mixtures, while the officinal pills are employed but very rarely.

It may often be desirable to give copaiva in the form of pills, but it seems more proper to leave it to the physician, who may direct an extemporaneous preparation in which copaiva may be combined with other medicines adapted to the case. In directing a pill mass, however, the physician must not expect the impossible of the pharmacist, who cannot furnish pills containing 5 or 6 grains of copaiva, rich in volatile oil, except by increasing their size to such a degree as to make boli.

For extemporaneous prescriptions, a proper pill mass may be formed of copaiva by mixing it with a sufficient quantity of magnesia, of which about an equal weight will be necessary; if very poor in copaivic acid, no proper consistence can be obtained; and if not objectionable, a small portion, about 5 or 10 per cent. of Canada or true Venice turpentine may be ordered as an addition; a portion of the magnesia may be substituted by one or more vegetable powders, like catechu, kino, rhubarb, cubebs, opium, &c. Such a combination involves less trouble in the preparation of the pills, than with the entire absence of a base, and the powders present are in nearly sufficient quantity to prevent the volatile oil from partially separating upon the surface.

A much better pill mass is formed by the addition of some spermaceti, as proposed by Geiseler, or of wax as recommended by J. Francis Simon about twenty years ago. Particularly the

latter has the advantage of retaining the whole of the volatile oil, and with the further addition of vegetable powder to remain in a plastic condition for years. A little wax does not in the least interfere with the medicinal action of the oleoresin; but the disadvantage is the number of pills required for a single dose, in which respect, however, this is not inferior to other extemporaneous forms of copaiva pills.

If the copaiva does not contain too large a proportion of essential oil, say not over 50 per ct., the quantity of copaiva may be one-third of the weight of the mass, while the wax must not be decreased to less than one-ninth. Simon has given the following proportions of wax, copaiva and vegetable powder each furnishing a good pill mas: 1: 1: 1; 1: $1\frac{1}{2}$: 2; 1: 2: 3; 1: $2\frac{1}{2}$: 4; 1: 3: 5. The same weight of any of these five mixtures contains one-third of copaiva, only the relative proportions of wax and vegetable powder are changed.

With copaiva containing a large amount of volatile oil, the first and second proportion will make good masses which are somewhat soft, but the pills retain their shape and no copaiva is separated; but when the wax is decreased to less than one-half of the weight of copaiva, the volatile oil is likely to separate partially upon the surface.

From a good copaiva containing more than 50 per ct. of volatile oil a good pill mass may be obtained with the following proportions, wherein the wax has been reduced to the smallest possible quantity: Wax one part, copaiva 2 parts, powdered cubebs (or some other vegetable powder) $3\frac{1}{2}$ to 4 p. The Hamburg Pharmacopœia of 1845, directs 2, 4 and 8 parts respectively for the *Pilulæ copaivæ compositæ*. In Germany, where such a combination is frequently prescribed, it is customary to roll the pills in some aromatic powder, like powdered cinnamon, which disguises the disagreeable odor and taste of copaiva. As stated before, such pills will retain their plastic condition for years; and the volatile oil, being protected by the wax and the powder, shows less tendency to change by oxidation, as may be inferred from the odor and taste of the pills after they had been made several years.

The manipulation in preparing these pills is as follows: the wax is fused at a moderate heat, the copaiva is now gradually

added, and immediately afterwards the powder is stirred into the warm mixture in small portions and well incorporated. The mass is then ready for rolling out and cutting into pills. It is, of course, requisite, during the incorporation of the ingredients, to keep the mass at as low a temperature as is possible for avoiding a loss of the volatile oil; but it must be sufficiently high to prevent the wax from congealing before the operation is completed. Some pharmacutists fuse together equal parts of wax and copaiva and keep this mixture on hand. It answers admirably, if the addition of much copaiva is not required for the prescription; the oleoresin it seems, does not combine so intimately with the wax in the cold as in the warm state, and the pills are therefore likely to sweat.

It deserves also to be mentioned, that the pills are not so large as might be judged from their weight; the wax decreases the bulk to a certain extent.

These extemporaneous copaiva pills are, I believe, almost totally unknown in the United States; but I am convinced that physicians, after they have once tried them, will find them superior to the solidified copaiva as usually kept; and the pharmacutists will be able to dispense the pills of this medicine as of others, of even size, perfectly globular and retaining their original shape. From these considerations, I have frequently recommended them to physicians, who have generally been satisfied with the result; and while connected with Parrish's School of Pharmacy, I had them prepared by all the classes. These pills deserve to be more extensively known and employed.

Brooklyn, N. Y., Nov., 1862.

SODA IN COAL.

BY E. S. WAYNE.

The presence of soda in coal, I have not seen mentioned in any analysis of it that has come under my notice, and presume the cause of its having been overlooked, is the minute quantity in it, only to be detected by operating upon much larger quantities than generally used in analysis.

My detection of it in coal was unlooked for and accidental.

Having frequently observed a pale ochreous deposit upon the casting stills I was using for the distillation of coal oil, curiosity at last induced me to make an analysis of it; and I found it to be composed of alumina, silica, oxide of iron and sulphate of soda. Now under this still had been burnt a number of thousands of baskets of coke from cannel coal, from which the crude coal oil had been extracted, and which was unquestionably the source of both the soda and sulphuric acid in the sulphate of soda found in the deposit. In what state the soda existed in the original coal, or in the coke, I cannot say. Whatever it was, it must have been reduced by the carbon of the coke during its combustion, to sodium, and its vapor deposited upon the bottom of the still, and being exposed to the sulphurous products of combustion, combining with them, and finally, through the agency of heat and air, was oxidized to a sulphate as found.

The presence of soda in coal is an interesting fact, in several respects, particularly so to the palæontologist and geologist, as it tends to point out the habitat of the vegetation, whose remains it consists of.

Cincinnati, Nov. 1st, 1862.

ASSAY OF ALKALOIDS—PURE AND IN PREPARATIONS.

BY FERDINAND F. MAYER.

In a paper laid before the last meeting of the American Pharmaceutical Association (August, 1862,) I pointed out the facility with which the iodohydrargyrate of potassium could be used for the quantitative determination of all vegetable alkaloids, either pure or contained in pharmaceutical preparations.

This test, which was first described by F. L. Winckler, in 1830,* as a qualitative reagent, and was introduced in 1846 by A. von Planta-Reichenau,† is simply a solution of corrosive sublimate in an excess of iodide of potassium, the strength of which for volumetric analysis is 13.546 grammes of corrosive

* Buchner's Repertorium, vol. xxxv. p. 57. On some Precipitates caused by solutions of Hydrochlorate of Quinia and by Iodide of Mercury.

† Das Verhalten der Alkaloide gegen Reagentien. Heidelberg, bei J. C. Mohr. 1846.

sublimate and 49.8 grammes of iodide of potassium per litre, constituting a *tenth normal solution*.

Of this solution it requires

1 cubic centimeter for the precipitation of

	In grammes.
1-10.000 of an equivalent of Aconitia	= 0.0267
1-20.000 " " Atropia	= 0.0145
1-20.000 " " Narcotina	= 0.0213
1-20.000 " " Strychnia	= 0.0167
1-20.000 " " Brucia	= 0.0233
1-20.000 " " Veratria	= 0.0269
1-30.000 of a double equiv. of Morphia	= 0.020
1-20.000 " " Conia	= 0.00416
1-40.000 " " Nicotia	= 0.00405
1-60.000 of a double eq. of Quinia	= 0.0108
	Cinchonia = 0.0102
	Quinidia = 0.0120

The compounds formed are the hydriodates of the base with iodide of mercury ; in consequence of which a part of the mercury used for precipitation remains in solution. For this reason a solution of chloride, and not of iodide of mercury must be used, inasmuch as with a solution of the latter the results very much differ ; nor must the solution of alkaloid be added to the mercuric solution, but the latter to the former. These precipitates form in acid, neutral, and slightly alkaline solutions, and, as Nessler noticed,* permit the separation of the bases from ammonia.

They are further not interfered with by the usual constituents of pharmaceutical preparations, except alcohol and acetic acid, in both of which the precipitates are soluble. In this the iodohydrargyrates and Groves'† bromohydrargyrates differ from all other precipitants of the alkaloids, which as a rule do not allow of the presence of starch, gum, albumen, or tannic acids.

As to the intensity of the reaction, it falls in some cases short

* Verhalten des Jodquecksilbers zu Ammoniak und eine neue Reaction auf Ammoniak. Inaugural Dissertation, Freiburg 1856. Also, Chemisches Centralblatt, 1856. No. 34.—Jahresbericht der Chemie for 1856.

† Quarterly Journal of the Chemical Society, vol. xi. p. 97. Pharm. Journal and Trans. vol. xviii. p. 131. Jahresbericht der Chemie for 1858.

of that produced by phosphomolybdic acid, while in others it far exceeds it.

Distinct reactions are obtained with iodohydrargyrate of potassium in solutions, containing

1-2500 of Morphia,	1-150000 of Strychnia,
1-7000 of Atropia,	1-50.000 of Brucia,
1-60.000 of Narcotina,	1-125000 of Quinia,
1-8000 of Conia,	1-75.000 of Cinchonia,
1-25000 of Nicotia,	1-50.000 of Quinidia.

In mixtures with inert, coloring or other ingredients the end of the precipitation is determined by filtration on a watch-glass, and testing the small quantity so filtered. The reaction is, however, rendered incomparably more distinct when a certain measure or bulk of solution has been prepared from the extract or mixture by means of dialysis through parchment paper.

But where no coloring matter or substances affecting nitrate of silver are present, the excess of iodohydrargyrate and of iodine and chlorine may at once be determined without filtration by the tenth normal solution of nitrate of silver, using Mohr's indicator, the neutral chromate of potassa; and where great exactness is required, and but small quantities of the substance are operated upon, the hundredth normal solution of silver should be used.

Each cubic centimeter of the tenth normal solution iodohydrargyrate requires for the separation of its iodine and chlorine 4 cubic-centimeters of tenth normal or 40 cc of hundredth normal solution of silver. Each cubic centimeter of the $\frac{1}{10}$ normal and every 10 cc. of the $\frac{1}{100}$ normal solution of silver correspond to 0.25 cc. of $\frac{1}{10}$ normal solution of iodohydrargyrate.

The precipitate of iodide of mercury and of alkaloid, at the concentration of the test-solutions, being in no way affected by them in testing a clear solution of an alkaloid, it is therefore only necessary to add enough iodohydrargyrate to be in excess, and then the $\frac{1}{10}$ or $\frac{1}{100}$ normal solution of silver with the precautions given by Mohr, until the red color of chromate of silver remains stationary.

For the use of pharmacutists not in possession of metrical weights or graduates, a solution prepared and to be used with Troy weights must be of the following strength;

16½ grains of corrosive sublimate and 100 grains of iodide of potassium are dissolved in enough pure water to make up 12½ ounces Troy = 6000 grains.

Of this solution every

10 grains will precipitate	0.0534	of a grain of	Aconitia
"	0.0289	" "	Atropia.
"	0.0389	" "	Atropiæ Sulphas.
"	0.0334	" "	Strychnia.
"	0.0466	" "	Brucia.
"	0.0538	" "	Veratria.
"	0.040	" "	Morphia.
"	0.050	" "	Morphiæ Sulphas.
"	0.0083	" "	Conia.
"	0.0081	" "	Nicotia.
"	0.0216	" "	Quinia.
"	0.0296	" "	Quinæ Sulphas.
"	0.0204	" "	Cinchonia.
"	0.025	" "	Cinchoniæ Sulphas.
"	0.024	" "	Quinidia.
"	0.0284	" "	Quinidiæ Sulphas.

From a flask with this solution balanced on the scales, the test liquor is added as long as it produces a precipitate which is to be found by repeatedly filtering; the balance is then restored by additional weights, which express the quantity of test-liquor consumed. The results obtained are sufficiently correct for pharmaceutical purposes. When the operator has sufficient faith in his ability to carry out a more lengthy operation, he may finish the assay with a solution of silver, containing in 6000 grains 81½ grains of pure nitrate of silver, every 40 grains of which solution correspond to ten grains of the Troy solution of iodohydrargyrate.

This method like all those of volumetric analysis precludes the presence of other alkaloids besides the one immediately concerned. It is directly applicable in solutions of a single alkaloid, or when only one alkaloid is assumed to be present. Mixtures of alkaloids will have to be parted by preparatory manipulations, unless, as in the case of the sulphates of the cinchona alkaloids, their different solubility in water or other solvents permits the direct application of the test in a certain degree.

An application of particular value to the pharmacist will

be the testing of the strength of such preparations, the value or action of which depends on the presence of one alkaloid, or two very closely related (conia, conhydria,) and about the qualitative nature of which he is not in doubt.

If such doubts exist, the alkaloid can be separated from the precipitate in the following manner :

A small quantity of the solution of alkaloid is precipitated by the iodohydrargyrate ; the precipitate is collected on a small filter, washed thoroughly with cold water, and, after draining dissolved in the smallest quantity of boiling dilute alcohol. To this solution a drop, or more according to the quantity of precipitate, of freshly prepared hydrosulphate of ammonia is added, and after this a drop or two of tincture of iron, taking care to have an excess of ammonia present. The whole is then thrown on a filter, washed with hot alcohol, and the filtrate, after being acidulated with sulphuric acid, passed through animal charcoal if necessary. It is then treated by Stas' and Otto's method for the elimination of alkaloids.

The subjoined assays of atropia and preparations of Belladonna and Stramonium will in part exemplify the details of the process, and also show some of the variations and changes of these preparations.

A number of the extracts of these narcotics included among those mentioned below, have been tried in an informal manner for the dilatation of the pupil by one of the surgeons of the New York Eye Infirmary, and whenever the effect had been closely watched, the strength of the extract was found to correspond with the quantitative test or percentage of alkaloid. The dilatation of the pupil is, however, a much more delicate reagent for very minute quantities of the mydriatics than either the iodohydrargyrate of potassium, or phosphomolybdic acid.

ASSAY OF ATROPIA AND PREPARATIONS OF STRAMONIUM AND BELLADONNA.

Equivalent of Atropia (Daturia) = 289 = $C_{34}H_{23}NO_6$.

“ “ Sulphate of atropia = 338 = $C_{34}H_{23}NO_6 + SO_3HO$.

1 cc. $\frac{1}{10}$ solution of iodohydrargyrate = 0.0145 of a gramme of atropia.

1 cc. $\frac{1}{10}$ solution of iodohydrargyrate = 0.0169 of a gramme of atropiæ sulphas.

1 cc. $\frac{1}{10}$ solution of iodohydrargyrate = 4 cc. $\frac{1}{10}$ solution of silver.

1 cc. $\frac{1}{10}$ solution of silver = 0.25 cc. $\frac{1}{10}$ solution iodohydrargyrate.

10 grains of Troy solution iodohydrarg. = 0.0289 of a grain of atropia.

10 grains of Troy solution iodohydrarg. = 0.0338 of a grain of atropiæ sulphas.

In order to test a solution of atropia, or a salt of it, it must not exceed one per cent. in strength, must be free from alcohol, acetic acid, or ammonia, in the presence of which precipitation does not take place. Nor must any soluble sulphuret or cyanuret be present, because they precipitate or decompose the reagent before its combination with the alkaloid.

A.—The Solution of 0.5 gramme of pure Sulphate of Atropia dissolved to 100 cc. in water.

10 cc. with 4 cc. $\frac{1}{10}$ solution iodohydrarg. showed 12.2 cc. $\frac{1}{10}$ solution silver, equal to 3.05 cc. $\frac{1}{10}$ solution iodohydrarg., instead of 2.95 cc., or 0.0517 gramme of sulphate of atropia, instead of 0.0500 gramme.

10 cc. with 3.5 cc. $\frac{1}{10}$ sol. iodohydrarg. showed 11.1 cc. $\frac{1}{10}$ sol. silver, equal to 2.9 cc. $\frac{1}{10}$ sol. iodohydrarg., instead of 2.95 cc., or 0.0491 gramme of sulphate of atropia instead of 0.0500 gramme.

10 cc. with 3.5 cc. $\frac{1}{10}$ sol. iodohydrarg. showed 11 cc. $\frac{1}{10}$ sol. silver = 0.0501 gramme instead of 0.0500

The average of these three assays, which were the first made by this method, is 100.6 p. c., instead of 100 p. c.

The precipitation is performed in a small beaker placed first on a sheet of dark glazed paper, while the iodohydrargyrate is being added. An excess of the latter is readily perceived from the non-increase of the precipitate, which is at first curdy, then falls together into a canary colored, resinous mass, which strongly adheres to the glass, and shrinks considerably before it hardens; exposed to the air it forms pearls of the appear-

ance of pale resin. It is a hydriodate of atropia with one equivalent of iodide of mercury, $C_{34}H_{23}NO_6HI + HgI$, one-half the mercury of the test-liquor remaining in solution.

After the precipitation, the beaker is placed on white paper, some carbonate of soda, and a few drops of a solution of chromate of potassa added, and the $\frac{1}{10}$ sol. silver dropped in until the red color of chromate of silver remains permanent after stirring.

The number of cubic centimeters of $\frac{1}{10}$ sol. silver divided by 4 and subtracted from the number of cubic centimeters of $\frac{1}{10}$ sol. iodohydrargyrate, leaves the quantity of the latter that has been consumed for precipitation. The last $\frac{1}{20}$ cc. of $\frac{1}{10}$ sol. silver is not counted.

The solutions to be tested should be divided into at least four equal parts, in order to enable the operator to repeat the test, and thus to control it.

B.—Preparations of *Datura Stramonium*.

I. *Juice from the Fresh Leaves*.—36 grammes of juice from 100 grammes of fresh leaves gathered in September, during the last period of flowering.

They were diluted to 100 cc. with the water with which the residual cake had been again pressed; then filtered. A little of the solution evaporated and calcined and the ashes exhausted with water, gave a slight precipitate with acid nitrate of silver. It was therefore tested with $\frac{1}{10}$ sol. iodohydrarg. alone, as was done in the case of all the other preparations.

25 cc. of the filtered diluted juice required for precipitation 1.3 cc. $\frac{1}{10}$ sol. iodohydrarg.

25 cc. of the same required 1.4 cc. $\frac{1}{10}$ sol. iodohydrarg.

“ “ “ “ 1.3 cc. “ “

For 100 cc. therefore 5.33 cc. = 0.0772 gramme or p. c. of atropia in the *fresh* leaves.

II. *Juice from 30 grammes of dried leaves, expressed after maceration with water, acidulated with oxalic acid, and diluted to 200 cc., then filtered.*

50 cc. precipitated required 2.9 cc. $\frac{1}{10}$ sol. iodohydrarg.

“ “ “ 3.15 “ “

200 cc. therefore = 12.1 cc. = 0.17545 gramme of atropia = 0.527 p. c. of atropia in the *dried leaves*.

The precipitation from the last assay, which was of a pale brownish color, was decomposed in the manner delineated above, using oxalic acid to acidulate, evaporated very slowly nearly to dryness, redissolved in water, filtered, and again tested with $\frac{1}{10}$ sol. iodohydrarg. required 3 cc. of the latter. This may be assumed as proof that the resinous coloring-matter (pseudo toxin?)* which is carried down with the precipitate, does not carry with it any of the iodide of mercury.

III. 50 cc. of the above solution from dried leaves were evaporated in the water bath, to the consistence of extract, then redissolved in water to 100 cc. and filtered.

70 cc. of this solution required for precipitation 0.5 cc. $\frac{1}{10}$ sol. iodohyd.

Before evaporation

2.1 cc.

Hence it would appear that about three-fourths of the atropia present in the original solution was driven off during the evaporation.

From an aqueous infusion of the dry leaves acidulated with oxalic acid, which, after the precipitation of the atropia, still retained the narcotic odor, an acid distillate was obtained, possessing an odor of tobacco, but containing neither ammonia nor alkaloid.

IV. *Tinctura Stramonii Fol.* (By displacement).

100 cc. were acidulated with oxalic acid and left to spontaneous evaporation. The residue was diluted to 100 cc. and filtered.

25 cc. required 1.1 cc. $\frac{1}{10}$ sol. iodohydrarg.

100 cc. of the tincture therefore = 0.0638 gramme or weight p. c. of atropia.

V. *Tinctura Stramonii Sem.* U. S. P.

50 cc. acidulated with oxalic acid, were left to spontaneous evaporation, then diluted to 100 cc. and filtered.

* From alcoholic preparations this coloring-matter is mostly chloryphyll.

50 cc. required 1 cc. $\frac{1}{10}$ sol. iodohydrarg.
= 0.029 p.c. of atropia.

VI. *Extractum Stramonii Fol. Fluidum* (By Prof. Procter's formula.)

50 cc. acidulated with oxalic acid, spontaneously evaporated, then diluted to 100 cc. and filtered.

25 cc. required 5 cc. $\frac{1}{10}$ sol. iodohydrarg.
= 0.59 p. c. of atropia.

(The same leaves extracted by water as under II. had yielded 0.527 p. c.)

VII. *Extractum Stramonii Fol. Alcoholicum.* (U. S. P.)

5 grammes dissolved in water acidulated with hydrochloric acid to 100 cc.

40 cc. required 2.6 cc. $\frac{1}{10}$ sol. iodohydrarg. = 1.886 p. c. of atropia.

VIII. 20 grammes of the same extract rubbed up with part of 400 cc. of water acidulated with hydrochloric acid, and dialysed through parchment paper into the remainder of the 400 cc. required 54 hours to give a solution of the same strength, at a medium temperature of 50° F.

IX. *Extractum Stramonii Fol. Siccum.* (Ph. Boruss. half strength.)

10 grammes diffused in dilute oxalic acid to 100 cc., then filtered.

25 cc. required 4.5 cc. $\frac{1}{10}$ sol. iodohydrarg.
= 2.61 p. c. of atropia.

C.—*Preparations of Belladonna.*

I. *Tinctura Belladonnæ* U. S.

30 cc. with oxalic acid, left to spontaneous evaporation, then diluted to 75 cc. and filtered.

25 cc. required 1.5 cc. $\frac{1}{10}$ sol. iodohydrarg. = 0.2175 p. c. atropia.

II. *Tinctura Belladonnæ ex herb. rec.* (Hahnemann's.)

100 cubic centimetres with oxalic acid, spontaneously evaporated; then again diluted to 100 cc. and filtered.

25 cc. required 3.75 cc. $\frac{1}{10}$ sol. iodohydrarg. = 0.2175 p. c. atropia.

III. *Extractum Belladonnæ Fol. Fluidum.* (By Prof. Procter's formula.)

a. 30 cc. of the fluid extract acidulated and left to spontaneous evaporation, then diluted to 100 cc. and filtered.

20 cc. required 4.5 cc. $\frac{1}{10}$ sol. iodohydrarg.
= 1.087 p. c. atropia.

b. 60 cc. of the same fluid extract, acidulated with oxalic acid, and evaporated on the water-bath; then diluted to 100 cc., and filtered.

30 cc. required 11 cc. $\frac{1}{10}$ sol. iodohydrarg.
= 0.88 p. c. of atropia.

This extract according to this assay, had lost one-fifth of the alkaloid by the evaporation.

IV. *Extractum Belladonnæ Alcoholicum.* (U. S. P.) from selected leaves, showed 4.03 p. c. of atropia.

V. *Extractum Belladonnæ Alcohol.* (U. S. P.) from another source, showed 3.56 p. c. of atropia.

VI. *Extractum Belladonnæ Siccum* (Pharm. Boruss. half strength,) gave 0.906 p. c. of atropia.

VII. *Extractum Belladonnæ Aquosum*, from selected leaves, gave 3.26 p. c. of atropia.

New York, December 10th, 1862.

GLEANINGS FROM THE GERMAN JOURNALS.

By JOHN M. MAISCH.

Solubility of benzoic acid and benzoates.—Dr. Rob. Otto, in a paper on some derivatives of benzoic and hippuric acid, gives the solubility in water of

1. Benzoic acid from urine, 1 in 392.1 parts.

2. Benzoic acid from oil of bitter almonds : 1 in 331 p.
3. Benzoic acid from chlorobenzoic, prepared from hippuric acid : 1 in 246.6 p.
4. The same after sublimation : 1 in 248.4 p.
5. Benzoic acid from benzalanine : 1 in 263.5 p.
6. Benzoic acid from chlorobenzoic, prepared from ordinary benzoic acid : 1 in 123.7 p.
7. Benzoate of potassa, prepared from urine : 1 in 26.5 p.
8. Benzoate of potassa, prepared from oil of bitter almonds : 1 in 1.5 p.
9. Benzoate of lime, with the acid from hippuric acid : 1 in 28.6 p.
10. With the acid from oil of bitter almonds : 1 in 37.7 p.
11. With the acid from chlorhippuric acid : 1 in 12.8 p.
12. With the same acid sublimed : 1 in 44.9 p.
13. With the acid from chlorobenzoic, prepared from ordinary benzoic acid : 1 in 14.4 p.

The statements have reference for the acid to water of 0° C. (32° F.), and for the anhydrous salts to water of 12° C. (54.6° F.) —(Ann. d. Ch. und Ph. 1862, May, 162.)

Assay of iodine.—For dissolving commercial iodine, O. Hesse replaces the sulphurous acid usually employed, by sulphite of ammonia, prepared from ammonia of 4 per cent., by passing into it gaseous sulphurous acid, until the liquid has a slight odor of the acid ; the iodide of silver is to be freed from a little sulphate by boiling with water acidulated with nitric acid.—(Ibid, 225.)

Urate of lithia.—Gust. von Schilling found, like Lipowitz, that, on boiling, 4 p. uric acid are dissolved by 1 part carbonate of lithia, with the extrication of carbonic acid, and that the solution gelatinizes on cooling ; but a neutral salt could not be obtained under any circumstance. The acid salt $\text{LiO}, \text{HO}, \text{C}_{10}\text{H}_2\text{N}_4\text{O}_4$, has a neutral reaction to test-paper, is decomposed by a current of carbonic acid, and dissolves in 38.97 p. boiling water, in 115.79 parts water of 39° C. and in 367.82 p. water of 20° C., (68° F.) —(Ibid, 241.)

Detection of morphia and strychnia.—J. Erdmann has extracted these alkaloids from the entrails of poisoned animals by means of his method with amylic alcohol. (See Amer. J. Ph.

x. 354.) The decoction with muriatic acid was strained, the liquid supersaturated with ammonia and evaporated after the addition of pure quartz sand, in order to reduce it to powder previous to its treatment with amylic alcohol. This solution is shaken with ten or twelve times its volume of acidulated water. Strychnia was precipitated by soda, morphia by ammonia.—(Ibid, June, 360.)

Influence of chloride of lime upon amylic alcohol.—F. Gerhard attempted to isolate from chloroform the compound which is colored dark-brown by sulphuric acid. Supposing it to be a derivative from amylic alcohol, he subjected 120 grm. of the latter to distillation in presence of 1500 grm. chlorinated lime and 2500 grm. water. The body mentioned had to be removed by sulphuric acid; the remainder contained chloroform and chloride of butyle. The residue in the retort contained butyric acid.—(Ibid, 363—366.)

Conversion of glyceric into acrylic acid.—By treating glyceric acid $C_6H_6O_8$, with iodide of phosphorus, F. Beilstein obtained iodo-propionic acid, $C_6H_3IO_4$. On boiling one of the salts of the latter, a new acid is liberated, hydracrylic acid, probably $C_{24}H_{22}O_{22}$, the lead-and-silver-salt of which yield on dry distillation acrylic acid $C_6H_4O_4$.—(Ibid, 366—374.)

Bismuthic acid.—The deep brown red precipitate, obtained on treating a solution of nitrate of bismuth with a concentrated solution of cyanide of potassium, has, after washing with boiling water, according to Deichmann and Boedeker, the composition $BiO_5 + 2 \text{ aq.}$ —(Ibid, July, 61.)

Reaction between muriatic and hydrocyanic acid.—A. Berthold states that muriatic acid gas, passed through anhydrous hydrocyanic acid, which is sufficiently cooled down, exerts no influence. If the latter is agitated with fuming muriatic acid, it separates like an ether upon the surface: under certain circumstances, however, a sudden and most violent reaction takes place and white crystals are separated. The same are formed quietly, if a homogeneous mixture of the two acids has been effected by means of alcohol. The crystals are chloride of ammonium, as was previously found by Kuhlmann.—(Ibid, 63.)

Decomposition of chloroform by potassa.—Pure or commercial chloroform, treated with alcoholic solution of potassa, particularly if the latter be diluted with water, evolves a gas burning with a green flame; but if the gas has been well purified by water, it burns with the dull blue flame of carbonic oxide. Prof. A. Genther concludes therefrom, that the formula of chloroform must be written C_2Cl_2HCl ; its phases of decomposition will then be as follows: First, the hydrochloric acid is removed; next the chloride of carbon is decomposed with the formation of the corresponding carbonic oxide, which is evolved as gas, but may be completely formed into formic acid, provided it meets with sufficient caustic potassa.—(Ibid, 121.)

Hydrobenzoinine, $C_{28}H_{14}O_4$, is a new body discovered by N. Zinin, it is the product of the reaction of nascent hydrogen upon pure oil of bitter almonds dissolved in alcohol; it crystallizes from ether in granules, and from alcohol in rhombic tables; it is not affected by alcoholic or aqueous solution of potassa. Treated with warm nitric acid of 1.36 sp. gr. it is entirely converted into pure benzoine.—(Ibid, 125, from Bull. de l'Acad. de St. Petersb.)

The transformation of sugar into mannite has been accomplished by E. Linnemann. Cane sugar is first treated with dilute sulphuric acid at ordinary temperature; the solution is freed from acid, concentrated and treated with sodium amalgam in small quantities. After the reaction is complete, the alkali is neutralized by sulphuric acid, the whole evaporated to a syrup and mixed with alcohol. The sugars of the formula $C_{12}H_{12}O_{12}$ behave very differently under the same circumstances; but several yield mannite. The author supposes that it is the levulose of the cane sugar modified as above, which changes into mannite, and which is probably the same sugar, obtained by Berthelot by an oxidizing fermentation from mannite.—(Ibid, 136—140.)

Rutine.—Zwenger and Dronke have investigated the rutine prepared from *Ruta graveolens* and *Capparis spinosa*, and compared it with quercitrine and robinine, both of which it closely resembles. The solutions of rutine and quercitrine show a nearly identical behaviour to reagents, but their physical properties, crystalline form, fusing point and solubility in water, are

very different. There is scarcely a difference in the physical properties of robinine and rutine, but the latter is precipitated by acetate of lead, and does not reduce an alkaline solution of cupric oxide, while robinine behaves quite reversely. The main difference between these three glucosides consists in the sugars which are combined with quercetine, as follows :

Quercitrine $C_{26}H_{10}O_{12} + C_{12}H_8O_8 + 6 \text{ aq.}$

Rutine $C_{26}H_{10}O_{12} + 2(C_{12}H_9O_9) + 5 \text{ aq.}$

Robinine $C_{26}H_{10}O_{12} + 2(C_{12}H_{10}O_{10}) + 11 \text{ aq.}$

—(Ibid, Aug., 145—157.)

Decomposition of subliming sal-ammoniac.—By surrounding the vapors of sal-ammoniac with an atmosphere of hydrogen, L. Pebal found, that free ammonia diffuses into this gas while the vapors of the salt contain free hydrochloric acid. It is evident therefrom that on vaporizing, sal-ammoniac is decomposed, and the abnormal condensation of its vapor is explained by the reunion of the two gases.—(Ibid, 199—202.)

Combination of nitrogen with metals.—Briegleb and Genther have experimented upon the direct combination of gaseous nitrogen with the metals at an elevated temperature. In this way they obtained the compounds Mg_3N and Cr_2N and ascertained that zinc, iron and aluminium will thus combine with nitrogen ; this is probably true for all metals whose nitrogen compounds remain unaffected by a high temperature.—(Ibid, 228—241.)

Baryta and strontia in lime stones.—When in presence of much lime, the spectra of baryta and strontia become invisible ; Kirchhoff and Bunsen, therefore, convert the alkaline earths into nitrates, and exhaust the lime salt by alcohol. Dr. Engelbach now shows that by igniting the carbonates of such mixtures of the alkaline earths, the oxides of strontium and barium are more readily formed than that of calcium, and may then be exhausted by boiling with a little water. The process is well adapted for the qualitative recognition of minute quantities of strontia and baryta in lime compounds.—(Ibid, 255—261.)

Sarkosina.—Chloroacetic acid yields under the influence of methylamina, according to J. Volhard, sarkosina, the same base which was first obtained by Liebig from kreatina.—(Ibid, 261—265.)

Precipitation of chlorides by muriatic acid gas.—Dr. C. Schraeder found that from a solution of the chlorides of potassium and sodium, muriatic acid gas separates mixtures which are at first richest in potassium; in the presence of chloride of magnesium the latter does not appear in the precipitate, until the solution has absorbed more than 20 per ct. of muriatic acid. Margueritte's results, (Cpt. rend. xliii. 50,) are thus contradicted.—(Ibid, 265.)

Oil of rue.—Dr. C. Harbordt has again analyzed the pure oxygenated portion of oil of rue and found Williams' results correct, namely $C_{22}H_{22}O_2$. Desirous to ascertain to which class of bodies it belongs, he oxidized it by chromic and by nitric acid, and obtained chiefly capric acid, but no acid containing more carbon. He concludes therefore, that it is not an aldehyde, but belongs to the ketones, that its rational formula is C_2H_3 , $C_{20}H_{19}O_2$ and consequently its proper name methylo-caprinol.—(Ibid, Sept. 293—297.)

Decomposition of solania.—Zwenger and Kind have before reported that solania $C_{86}H_{70}NO_{22}$ is on boiling with dilute acids decomposed into solanidia $C_{50}H_{40}NO_2$ and sugar, but that by concentrated acids, the solanidia yields two new bases. These have since been investigated. One is readily soluble in ether, appears as a resin-like yellow mass and yields uncrystallizable salts; cautiously heated in carbonic acid, it yields crystalline solanidia; of which it is probably a modification.

The other base dissolves in 2000 parts of boiling ether, and is obtained in crystalline yellowish floccules or fine needles; the solutions of its salts are colored violet by concentrated sulphuric acid, and red by most other concentrated acids. Its composition is $C_{50}H_{39}NO$; the authors have called it solanicia. Both bases are very sparingly soluble in boiling alcohol.—(Ibid, 341—347.)

Decomposition of coffeina.—A. Strecker has boiled a concentrated aqueous solution of coffeina with two volumes of concentrated baryta water, and found in the distillate ammonia and methylamina, while the retort contained besides carbonate of baryta and some other organic compounds, a new alkaloid, coffeidina, $C_{14}H_{12}N_4O_2$, which is a stronger base than coffeina, is little soluble in ether, readily in water and alcohol, and does not

crystallize on evaporating these solutions; its sulphate crystallizes in long colorless needles.—(Ibid, 360—363.)

Oxidation by alloxan.—A. Strecker observed that alloxan is colored purple by alanine, and that with a moderate heat carbonic acid and aldehyde are given off. Leucine behaves similarly, valer-aldehyde distilling over. Alloxan combines with hydrogen to alloxantine, which forms murexide with ammonia, at the same time alanine and leucine are oxidized to aldehyde, carbonic acid and ammonia. The reaction of glycocoll is similar; but the aldehyde of formic acid could not be detected.—(Ibid, 363—365.)

Hog gall.—Among the constituents of hog gall, which are present only in small quantities, A. Strecker found carolactic acid, a phosphuretted fat, which was previously observed by Gobley in ox gall, and an organic base, cholina $C_{10}H_{13}NO_2$. Its platino-chloride crystallizes in orange-yellow thin laminæ; the muriate, sulphate, carbonate, nitrate and oxalate are uncrystallizable. Cholina was also prepared from ox gall.—(Ibid, 353—359.)

Identity of melampyrine and dulcite.—Melampyrine was discovered by Hünefeld in the herb of *Melampyrum nemorosum*, and afterwards found in *Scrophularia nodosa* and *Rhinanthus crista galli*; Eichler has given the formula $C_{12}H_{15}O_{13}$.

Dr. L. Gilmer has examined melampyrine prepared by E. Merck, of Darmstadt, and from the elementary analysis of it and its baryta compound, calculated the formula $C_{12}H_{14}O_{12}$. From the angles of its monoklinometric crystals, from the fusing point ($182^\circ F.$), from the behaviour to nitric acid, and metallic oxides, and from the solubility in water, (100 parts dissolve between 15 and $16^\circ C.$ 32 to 34 parts,) the author concludes, that it is identical with dulcite, and also with Kubel's euonymite, prepared from *Euonymus europæus*.—(Ibid, 372—377.)

ON LIQUID RENNET, OR RENNET WINE.

BY WILLIAM PROCTER, JR.

It has long been known that the mucous coat of the stomach of the calf, pig, and other young mammals possesses the power of coagulating the casein of milk, as in the making of cheese; but it is only of latter years that attempts have been made to introduce a solution of *rennet*, as this substance is called, into Pharmacy with a view to the *cuisine*, as well as for use in medicine. For several years *pepsin*, the proximate principle to which this coagulating power is attributed, in an impure state, has been an article of commerce with a view to medicinal use in diabetes and other diseases; that prepared by M. Boudalt, of Paris, having acquired some celebrity.

In several pharmaceutical works, recipes for making "Liquid Rennet" may be found, but these vary much, both as regards the strength of the solution and the preservative ingredients. The dried stomach of the calf prepared by salting it, and stretching it over a bent hoop to facilitate its desiccation, is familiarly known in the markets of Philadelphia under the name of rennet, and most housekeepers prefer to keep and use it in this state, or by cutting this up and macerating it in wine, but for those who aim at manufacturing the solution for commerce, it is preferable to employ the recent membranes both on account of economy and efficiency.

Pepsin has never been isolated in a state of purity; it seems to be secreted by glands located in the mucous coat of the stomach, and in connection with hydrochloric, and perhaps lactic acid, constitutes the active portion of what is called the *gastric juice*, concerned in the process of digestion. It is to this mucous coat of the organ, therefore, that attention must be given; and inasmuch as the rennet tends to exercise its digestive power on the membrane itself, there is a propriety in using mechanical means to effect the rupture of the mucous coating to facilitate the extraction of the active principle without cutting it up, by malaxating them in water with salt, to which weak alcohol or wine is subsequently added. Some prefer at once to separate by the knife the mucous coat with the glands, but generally the whole organ is cut up, mixed with salt and water, and well malaxated at intervals, for a time varying from twenty-four hours

to two months. Soubeiran gives the following recipe as that of Wislin. He takes of the stomachs of young calves, *ten* parts; chloride of sodium *three* parts; alcohol, of 80 per cent., *one* part; and water *sixteen* parts. The stomachs are slit with a scissors so as to expose the interior, they having been previously gently rinsed to remove foreign particles adherent; they are then malaxated with the dry salt thoroughly, and left in a cool place until the cheesy odor at first apparent, becomes replaced by that of rennet, which requires one or two months. At this period it is macerated in the water for a short time, the alcohol is added, and the liquid portion strained off and filtered for use.

Dorvault, in his "L'Officine," gives the following recipe: "Take of recent rennet 375 parts; common salt 60 parts; alcohol of 75 per cent., 60 parts; white wine 1000 parts. Digest the whole for a month and filter. A teaspoonful is sufficient for a quart of milk."

Some believe that the rennet during the protracted process of curing by salt is rendered more active, and that it is necessary to delay the final process of solution until after that operation; but this is doubtless incorrect, in fact, though it may seem to be true, as the truth lies more in the mechanical effect of salting in breaking or causing the shrinking of the tissue, and in altering the resistant or pulpy condition of the mucus, than in any development of increased power; and hence, there appears to be no good reason why it should be protracted beyond a few days, unless with the intention of curing the rennets for future use. After several trials the following is offered as a practicable formula for making

LIQUID RENNET, OR RENNET WINE.

Take of Fresh Rennets, (about three,)	twenty-four troyounces,
Chloride of sodium,	three troyounces,
Alcohol,	six fluidounces,
White wine,	sixteen fluidounces,
Water,	a sufficient quantity.

Having turned the rennets inside out, and washed them by a gentle stream of water for a few moments without any friction, and having placed them in a shallow dish, sprinkle half of the

salt over them, and, with the hands malaxate them vigorously for fifteen minutes, aiming to disengage the mucous secretion, then add a pint of water, again malaxate, and after standing several hours strain off the thick mucilaginous liquid by pressure in a loose-textured cotton cloth. Return the rennets to the dish, sprinkle on the remainder of the salt, again repeat the process of malaxation, maceration and expression. Let these operations be repeated a third time, or until the fluid obtained measures forty-two fluidounces; then, having mixed the alcohol with the wine, add them to the expressed liquid, and agitate the mixture several times at intervals of an hour or two; after which allow it to stand until the mucus which is precipitated by the alcoholic addition subsides, when the nearly clear solution of rennet may be drawn off with a syphon, and filtered for use. The wine may be substituted by a mixture of one part of alcohol and three parts of water. A tablespoonful of this solution readily coagulates a quart of milk to a firm curd, if added after gently warming the milk (to about 100° F.) stirring it well for a moment, and allowing it to stand undisturbed for half an hour or an hour. *Cold custard* is made in the same manner by previously adding a tablespoonful or more of sugar, and some vanilla or other flavoring before adding the rennet. When liquid rennet is employed for medicinal purposes, it is preferable to make it with wine, as being more acceptable to the stomach.

ON THE FORMATION OF AMMONIA BY MEANS OF WATER AND ATMOSPHERIC AIR.

BY M. F. C. SCHOENBEIN.

The importance of the subject, in an agricultural and industrial sense, has induced us to give a complete analysis of this interesting work.

The author takes, as a starting point the observation made by him, about a year ago, on the combustion of phosphorus; he proved, in short, that nitrate of ammonia is formed by the slow combustion of that body.

The constant presence of nitrate of ammonia in rain-water led him to conclude that the formation of this salt was due to yet

other causes than to nitrogenised matters under decomposition, or to atmospheric electricity. The following is the first experiment which induced him to study more closely this interesting observation.

A platinum capsule was heated until a drop of water thrown into it was immediately converted into vapor without taking the spheroidal form. Perfectly pure water was used, and dropped so slowly, that one drop had evaporated before the arrival of a second. Above the capsule was a small inverted vessel in which the vapors were condensed. On examination, the water collected in this way was found to contain an appreciable quantity of nitrate of ammonia; in fact, when acidulated with sulphuric acid, it instantaneously colored blue starched iodide of potassium. Treated by caustic potash, it threw off white vapors when approached by a rod moistened in hydrochloric acid; turmeric paper placed above the vessel became brown.

Whether platinum, silver, copper, iron, or porcelain capsules were employed, the same result took place.

By using a copper alembic, much larger quantities of the liquid can be prepared. The empty alembic is made sufficiently hot to speedily vaporise the water without its taking the spheroidal shape. Small quantities of water were successively introduced, one portion being completely evaporated before the addition of another. The alembic was furnished with a Liebig's condenser, and the condensed liquid collected. A colorless neutral liquid was, in a short time, formed in the receiver, which gave to starched iodide of potassium, with the addition of a little pure sulphuric acid, an intense blue color, while it decolorised permanganate of potash.* This solution, decomposed by pure potash and evaporated to dryness, leaves a residue with all the characteristics of nitrite of potash. The solution of nitrite of ammonia cannot be evaporated without volatilising the greater part of this salt. In preparing the above solution it is difficult to guard against this kind of loss.

* We have found by experience how difficult it is to obtain sulphuric acid sufficiently pure, and giving no color to iodised starch solution. However, this is effected by purifying commercial acid from the nitrated compounds it contains, by M. Pelouze's process, which consists in boiling it with sulphate of ammonia.

When treated by sulphuric acid, this nitrite of potash residue disengages red vapors. When the liquid collected during distillation is acidulated with sulphuric acid, instead of being treated by caustic potash, sulphate of ammonia is obtained as residuum after evaporation. In this case, also, commercial acids must be distrusted, since they often contain ammoniacal salts.

In making various consecutive operations, the concentration of the liquids obtained varies greatly. The author attributes these variations to the differences of temperature, which it is difficult to fix. Diluted with 500 times their weight of water, these solutions often continue to give a blue color to starched iodide, while at other times the coloration is very faint, if not null.

Evaporation of Pure Water and Alkaline Solutions.

In pursuance of his researches, the author has remarked the formation of the same compound by the simple evaporation of pure water in a porcelain capsule. As proof, it is only necessary to suspend, over the evaporating vessel, papers impregnated with a caustic potash solution. In fifteen or twenty minutes these papers become colored by contact with the iodised reagent. Linen, well washed in pure water, may be used for the same purpose. The nitrite of ammonia formed during the evaporation of the liquid is carried off by the water vapor, and decomposed by contact with the alkaline liquids impregnating the linen or paper, and which are transformed into alkaline nitrites.

When, in place of caustic potash, the cloth is saturated with hydrochloric acid, the presence of hydrochlorate of ammonia can be shown. The same phenomena is observable when the evaporation takes place at from 40° to 70° C.; in this case, however, the cloth must be left for half a day in contact with the vapor.

A residuum containing nitrite of potash is obtained by evaporating a weak solution of potash, instead of pure water. Hence it is very difficult to prepare caustic potash, which imparts no color to the starched iodised sulphuric reagent.

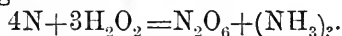
Nitrite of potash is formed also when the evaporation takes place in the open air, and at the ordinary temperature. Filtering paper, saturated with pure water, and dried in the open air,

becomes colored by the starched iodised reagent. All tissues dried in the air usually give the same reaction, as also does sand when washed and dried. In this state, treated with a small quantity of pure water, and then filtered, the filtered liquid produces the reaction of nitrites.

One hundred grammes of water, sheltered from dust, and evaporated in the air to 100th of ahe primitive volume, yields a liquid which disengages ammonia when treated by potash, and to starched iodide of potassium, with sulphuric acid gives an intense blue color.

It results from these experiments, that, whenever pure water, or an alkaline solution is evaporated, nitrite of ammonia is formed. After prolonged contact with the air, the nitrites or nitrates are visible on the surface of all bodies which have been damped and dried in the air. The author has remarked the presence of nitrite of potash on the surface of glass, especially of roughed glass, which, by reason of its texture, retains more water, and dries more slowly.

Though unable to give a practical solution to this theoretical question, the author is of opinion that the formation of nitrite of ammonia can be explained only by the direct combination of atmospheric nitrogen with water:



He reserves the question, whether evaporation in the midst of pure nitrogen gives the same results, and whether it is necessary to effect the combination. However, he has remarked that in water left for several weeks in contact with the air, in closed vessels, the salt is not formed.

Nitrite of ammonia, being, as we have seen, formed by the concurrence of water and air and heat, it was probable that this product would be found in all products of combustion.

Combustion.

In 1845, M. Schoenbein observed that fatty bodies, as well as hydrocarbides, disengaged, during combustion, a body possessing oxidising properties, coloring starched iodised paper.

With the object of elucidating this matter, he constructed a small sheet-iron furnace, provided with a grate and a chimney. The gases produced by the combustion escape by the chimney.

If, by a proper disposition of the apparatus, the gases are made to pass over water, while wood charcoal is burning, the water becomes charged with nitrite of ammonia, provided always that the combustion be not too fierce. A small sponge, saturated with pure water, being suspended in the pipe served as a chimney, in a few moments the presence of nitrite of ammonia in the water in the sponge is easily recognisable.

The same results are obtained by suspending the sponge above an ordinary lamp, or in a chimney through which wood or coal smoke escapes. However, with coal rich in pyrites no reaction is observable, because sulphuric acid decomposes the salt of ammonia as it forms.

Nitrite of ammonia is not to be found in the products of combustion of bodies which, at the same time, form powerful acids.

The presence of ammonia can be recognised by burning phosphorus, under an inverted receiver, on a plate covered with water, until the water has a strong acid reaction. This ammonia proceeds from the decomposition of nitrite of ammonia in contact with phosphoric acid. The white vapors which form in the receiver are composed of nitrite, as is easily verified by suspending a sponge in them. The nitrous acid decomposes into binoxide of nitrogen and hyponitric acid.

Slow combustion of phosphorus causes also a disengagement of nitrite, which can be collected in a sponge saturated with water.

It is well known that arsenic, heated to about 200° , burns slowly while undergoing transformation into arsenious acid. If, at this moment it is introduced into an inverted receiver, and the operation repeated several times, the liquid becomes charged with ammonia. The air of the receiver contains no nitrous acid, as this acid will be decomposed; for the liquid containing the ammonia contains, at the same time, arsenic acid, formed seemingly at the expense of the oxygen and nitrous acid.

Even sulphur forms no exception. The liquid of the receiver contains sulphuric acid, sulphurous acid and ammonia.

Applications.

We have seen that nitrite of ammonia is formed, in many cases, of combustion; and it is probable that the same compound is formed in all cases.

The author ascribes the formation of this salt, not to the combustion itself, but to the concurrence of heat, water, and air.

He observes, that these results are of great importance to the theory of nitrification.

Chemists admit that nitric acid is formed by the oxidation of ammoniacal salts proceeding from nitrogenised matters, and that atmospheric nitrogen has nothing to do with it. While recognising all the importance of this remark, the author is of opinion that evaporation is the chief agent in nitrification.

Everywhere water is to be found evaporating, especially on the ground; nitrite of ammonia ought also to be found everywhere; and by contact with alkaline bases, alkaline nitrites are formed, which oxidise in the air, and are transformed into nitrates.*

In our rainy countries nitrites are carried away by the water, and, consequently, do not accumulate; but it is otherwise in hot countries, and especially in certain parts of the West Indies, where the dry season is of several months duration, and where there are to be found vast plains of alkaline earth.

The presence of nitrogenised matters is not a condition *sine qua non* of nitrification; nitrate of potash is formed in Bengal, in places where no nitrogenised matters exist capable of furnishing ammonia.

According to the author, attempts should be made to produce saltpetres artificially, aided by the data contained in this memoir.

The presence of ammoniacal salts in volcanic vapors, recently confirmed by M. Charles Deville's researches, should be ascribed, says the author, to evaporation only, for it is impossible to admit the presence of nitrogenised matters in volcanoes. Hydrochlorate of ammonia is formed by contact with hydrochloric acid and nitrite of ammonia. Disengagements of hydrochloric acid have likewise been observed by M. Deville.

The formation of nitrite of ammonia is of great importance

* The author has observed that the "pure" potash of the laboratory almost always contains nitrite, proceeding from the evaporation of alkaline solutions, as can be proved by dissolving it in water, and adding *pure* sulphuric acid and the starched iodised reagent. It is the same with sulphuric acid, and generally with water, distilled or not.

also in vegetable chemistry. Chemists have proved that plants cannot assimilate free nitrogen. To render assimilation possible, the nitrogen must exist in certain combinations; ammonia and nitrates are supposed to contain nitrogen in a suitable form. If such be the case, nitrite of ammonia, produced by evaporation, contains nitrogen in an assimilable state. Each plant itself a cause of evaporation, furnishes the portion of assimilable nitrogen necessary to it, whilst the salt is formed, in like manner, in earth moistened by rain.

Presence of Nitrite of Ammonia in certain Fluids of the Economy.

Saliva contains nitrate of ammonia. With addition of sulphuric acid, it colors starched iodide blue. Treated with potash, it throws off white vapors, by contact with hydrochloric vapors, and browns turmeric. These reactions, however, sometimes fail; but that may be caused by the presence in the saliva of sulphocyanide of potassium, which decolorises blue starched iodide. The color appears only when the nitrite is in excess.

This process is inadmissible for the detection of nitrite in urine, because this liquid has also the property of decolorising blue starched iodide, as M. Pettenkoffer's experiments prove.

The pituitary secretions show the reaction of the nitrites; but it varies in different persons, and is not always constant in the same individual. The presence of nitrite of ammonia in these liquids has not been previously observed.—*Verhandlungen der Naturforschenden Gesellschaft in Basel, from Lond. Chem. News, Novem. 15th, 1862.*

LINT PREPARED BY MACHINERY.

The *Scientific American* says that lint for hospital use may be prepared very rapidly by a carding machine.

Take any cylinder from six to ten inches in diameter, covered with common card clothing; lay an old card "doffer or lickerin" on the "strippers" of a wooden card; place it on a "grinder" frame, or even upon the centers of a common lathe, where a velocity of 600 or 800 revolutions per minute can be obtained; then take old table covers, napkins, sheets, &c., or any old linen

rags ; and apply one end to the cylinder, holding fast with one hand to the other end ; with the other hand press the goods on to the cylinder, guarding this hand by fastening a piece of belt leather to the palm, allowing the end of the same to project one-half an inch beyond the finger tips. Do not allow the cloth to lie upon the cylinder too far, as it will only tear the cloth or make a poor quality. One person, by this process, can produce more lint, and of a superior quality, than 5,000 can by scraping in the ordinary way, in the same time.—*Med. and Sur. Rep.*, October 4, 1862.

ON THE PREPARATION OF INORGANIC CARBON.

BY GEORGE GORE, Esq.

Intimately mix one part of amorphous phosphorus and two parts of anhydrous carbonate of soda, both in fine powder ; project the mixture, in small portions at a time, into a red hot clay crucible, keeping the crucible covered as much as possible, and not adding each fresh portion of the mixture until the white flame of burning phosphorus (which issues from a small hole in the cover) has quite disappeared. Digest the porous and cooled residue in water, filter, and wash until all alkalinity has disappeared. An abundant residue of exceedingly light carbon will be obtained, which, when dried, will be equal to about four-fifths of the calculated quantity, if the process has been carefully conducted and the crucible kept well covered.

A similar experiment made with anhydrous borax instead of carbonate of soda yielded no boron.

The following modification has on several occasions succeeded well as a lecture experiment :—Into a long and narrow test-tube, of German glass, place first a fragment of white phosphorus about the size of a large pea, then fill a length of about two inches of the tube with anhydrous carbonate of soda in powder ; support the tube at its mouth in a horizontal position ; heat the end of the carbonate most distant from the phosphorus to redness by a lamp, and then apply a moderate heat to the phosphorus by gradually shifting the lamp towards that end ; the instant the phosphorus melts and volatilises, the whole of the red hot carbonate becomes quite black, and exhibits a striking contrast to its previous whiteness.—*London Chem. News*, Sept. 27, 1862.

PREPARATION OF OXYGENATED WATER, AND ITS
THERAPEUTICAL USE.

Dr. Ozanam gives the name of oxygenated water to water which is distilled and afterwards charged with oxygen under the influence of high pressure. The experiments he made have led him to establish three modes of operation by this new medicine. 1. It improves the condition of the blood in cases where that fluid is impaired or deficient, as in dyspnœa, asthma, slow asphyxia, cyanosis, diseases of the heart, hæmorrhoids, and hæmorrhoidal visceral congestion. 2. It possesses an oxidizing or metamorphic action in cases where the organic products are arrested in their development, as happens in glycosuria, gout, the uric and oxalic gravel, and perhaps in scrofula. 3. It exerts an exciting and regulating action on the brain and the thyroid gland, and hence its use in goître and cretinism. If, in fact, snow-water taken as drink gradually produces these morbid conditions, it is because it is entirely deprived of vital air. On the other hand, oxygenated water, as well as the inhalation of gaseous oxygen, produces no results in hemicrania, and unfavorable ones in cases of inflammatory disease. Thus, in croup, the oxygen temporarily tranquillizes the dyspnœa, but increases the fever. In the treatment of ulcerated cancer the oxygenated water revives pretty well the powers of the patient, and the wounds resume a more vivid and rosy color, but they do not heal; and if the surfaces are bathed with rags steeped in oxygenated water, even when very slightly charged, the ulcer is soon observed to become gangrenous on the surface. Oxygenated water is perfectly limpid and pure, and the gas is disengaged in the form of very fine bubbles. Having little taste, it resembles in this respect water which is deprived of air; and, like the latter, it is a little heavy for the stomach.—*B. and F. Med.-Chir. Rev.*, July, 1862, from *Compte Rendu de l'Acad. des Sc.*, Nov., 1861.

ON A SPURIOUS GLYCERINE.

BY HARRY NAPIER DRAPER, F. C. S.

I have recently had occasion to examine an article which, under the name of "German Glycerine," has found its way into

commerce, and, I have reason to believe, to a considerable extent. Apart from the importance of exposing a fraud which is at once the most ingenious and the most shameless which has ever come under my observation, it presents one or two points of interest.

This so-called "glycerine" is a semi-fluid mass, so viscid as to be with difficulty poured from one vessel to another, colorless, and perfectly, almost brilliantly, transparent. It is absolutely free from smell, and its taste is less sweet than that of pure glycerine as represented by the preparation of Price's Candle Company. It has a density of 1.436. (The specific gravity of anhydrous glycerine is 1.270; of Price's, 1.240.) This high density was of itself sufficient to show that this substance could not be pure glycerine, and it was further examined, with the following results:—

Evaporated at a temperature sufficient to cause ebullition, it gave off watery vapor, and, on cooling, solidified into a transparent brittle mass.

At a higher temperature this solid fused, became colored, and was finally converted into a shining black substance, easily recognisable as caramel.

Boiled with solution of potash, it gave a brown liquid.

Heated with a few drops of solution of sulphate of copper and excess of potash, an immediate and abundant precipitate and suboxide of copper was produced.

Largely diluted with water, and placed in contact with yeast at a temperature of 60° F., active fermentation rapidly set in, alcohol and carbonic acid being produced.

These results placed beyond doubt that the "glycerine" consisted, if not wholly, at least in great part, of a concentrated solution of glucose, but it still remained to be decided whether *any* glycerine was present. Now, while I am, for my own part, satisfied that it does not contain glycerine, it is by no means easy to demonstrate the entire absence of this body.

That, however, glucose forms by far the greater part of the syrup, is shown by its becoming solid on evaporation, by the transformation of apparently the whole of this solid into caramel, and by the fact that, when the glucose had by fermentation

been converted into alcohol, glycerine could not be detected in the evaporated residue. Pure glycerine, largely diluted with water, and left in contact with yeast for the same time, and under like circumstances of temperature, &c., underwent no change. It was necessary to make this experiment, as glycerine is, at a somewhat higher temperature, converted by yeast into propionic acid.

An attempt to detect the presence of glycerine, by taking advantage of its ready solubility in absolute alcohol, was unsuccessful, as the residue from the evaporation of the alcohol proved to be uncrystallisable grape sugar.

I had hoped that the absence of the characteristic odor of acrolein, when the mass resulting from the evaporation of the syrup was heated with anhydrous phosphoric acid, would have been a conclusive proof of the absence of glycerine; but it was found to be practically impossible to recognise this odor in the presence of the irritating vapor evolved during the caramelisation of glucose.

My reason for thinking it probable that some glycerine was present was this:—I thought it likely that it might be used for the purpose of preventing the crystallisation of the glucose; but I am now of opinion that the syrup consists of the uncrystallisable modification of this sugar.

It would be very interesting to learn the exact process by which a solution of uncrystallisable sugar, so free from color and so transparent, was obtained; as, from its great density, it would doubtless prove valuable in preserving many substances which, like iodide of iron, are easily oxidised.

If it be found, on further experiment, that glycerine suffers decomposition in contact with yeast and glucose, at the lowest temperature sufficient for the fermentation of the latter, a reliable mode of detecting very small quantities of glycerine in the presence of this sugar will still be a desideratum. Since, however, the above experiments were made, it has been suggested to me by my friend, Professor Galloway, that a modification of the method of Fehling might be used for the isolation of glycerine under these circumstances.—*London Chem. News*, Oct. 25, 1862.

STATISTICS AND ASSAYS OF "VIRGIN SCAMMONY."

BY EDWARD R. SQUIBB, M. D., Brooklyn, N. Y.

Scammony may be easily obtained in the ordinary drug market at prices varying between fifty cents and eight dollars per pound, and is occasionally met with at nine to twelve dollars per pound. The so-called "virgin scammony," however, in several varieties as "Tchangaree," "Beybazar," etc., ranging between six dollars and fifty cents and twelve dollars per pound, is confined to a few importers, and is not always to be found in quantity. During the years 1860 and 1861, and the first half of 1862, at least one thousand pounds of "virgin scammony" were met with in the New York market, and carefully examined by the writer, the results being noted.

It generally occurs in soldered square tin boxes, containing twenty-five to twenty-eight pounds each, four such boxes being packed in a wooden box for transportation. Occasionally, however, it is seen in round wooden boxes or drums of a similar capacity. The scammony is in irregular, rough and fissured masses of various sizes, sometimes porous, but commonly solid, hard and semi-resinous, having a tough, dull fracture. It is of a very dark grayish green color internally, often nearly black, but more of an ash color externally. It is rarely dry enough to be pulverulent, yet still more rarely too moist to be rubbed into coarse powder, and it generally loses six or seven per cent. in drying sufficiently to make a fine powder. The amount of moisture is, however, very variable, and thus has great influence upon the percentage of resin.

The appearance of this scammony is tolerably uniform, and it has not a single sensible property which can be relied upon as indicating its true value. The usual mode of assaying it is to select a specimen, rub it to powder, weigh the powder, wash it two or three times with ether, dry and weigh the residue, and having subtracted its weight from that of the powder, to call the remainder resin of scammony. This method is not only very inaccurate, but is fraudulent in the results, because all the mois-

ture is knowingly stated as resin of scammony. It is, however, still used to sell by, despite of a knowledge of its inaccuracy.

The method of assay used by the writer, and believed to be simple, easy, and practically accurate, is as follows: Take a very small piece, from one-third to one-half of the lumps of the package, and a little of the dust that is rubbed off by attrition during transportation, and found at the bottom of the box. Powder the whole of this sample, and pass the powder through a small sieve of coarse bolting cloth. If only that portion of the powder, which first and most easily passes through the sieve, be taken, a false result will be obtained; or, if the sample be allowed to lie for a day or two, either powdered or unpowdered, before being weighed off for the assay, the results will be inaccurate from loss of moisture. Mix the whole powder thoroughly, weigh off from it five grammes, put this into a vial of the capacity of 50 cubic centimetres, (29.52 c.c. to the f.℥,) fill the vial two-thirds full of strong ether, cork and shake it well, and then allow it to settle until the solution becomes clear. Decant the clear solution as closely as possible into a tared capsule, fill the vial again with strong ether, and proceed as before. Repeat this washing with ether a third time, and having collected the clear solutions in the capsule, evaporate them to dryness, and carefully heat the residue in the capsule in a hot air bath to somewhat over 212°. When cold weigh the capsule and contents, subtract the tare and note the remainder as resin of scammony, if the scammony be not adulterated with any other resin. The rule of simple proportion will then give the percentage of the resin, and consequently the true value of the scammony.

Within the period before-mentioned, thirty-four packages of "virgin scammony," representing more than one thousand pounds, have been assayed by the writer, and the results of these are given in tabular form below. At least one-third of the whole number of these parcels were purchased by the writer upon the assays made, and the resin extracted for making compound extract of colocynth; and in these cases the results of the assays were commonly found to be from one-half of one per cent. to one and a half per cent. too low. This may be accounted for by the extraction on the large scale having been made with 95 per cent.

alcohol instead of ether, while the general results show the practical accuracy of the method of assay.

No. of the Assay.	Date of the Assay.	Source from whence the Scammony was obtained.	Per centage of Resin of Scammony.	
1	1860, Feb. 29,	Schieffelin Brothers & Co.	33.3	Special importation.
2	Mar. 15,	Jas. S. Aspinwall.	54.9	
3	Oct. 26,	Merrick & Bull.	57.0	
4	" "	Schieffelin Brothers & Co.	33.5	
5	" "	Lazel, Marsh & Gardner.	56.0	
6	" "	Jas. T. Maxwell.	57.1	
7	" 28,	" "	72.1	
8	1861, Jan'y 22,	Schieffelin Brothers & Co.	65.9	
9	April 18,	Merrick & Bull.	58.0	
10	May 7,	Schieffelin Brothers & Co.	58.3	
11	July 19,	Jas. S. Aspinwall	28.9	
12	" "	" "	31.8	
13	" "	" "	29.7	
14	" "	" "	32.2	
15	" "	" "	30.0	Special importation.
16	" "	" "	32.4	
17	" "	" "	41.6	
18	" "	" "	27.9	
19	" 20,	Merrick & Bull.	58.5	
20	Aug. 3,	Schieffelin Brothers & Co.	47.0	
21	Dec. 20,	Merrick & Bull.	79.7	
22	1862, Mar. 26,	Schieffelin Brothers & Co.	28.8	
23	" 30,	" "	30.3	
24	" "	" "	29.3	
25	" "	" "	30.5	
26	May 23,	" "	73.1	
27	" "	" "	62.4	
28	" 30,	Jas. S. Aspinwall.	63.7	
29	June 1,	Schieffelin Brothers & Co.	68.8	
30	" 24,	Merrick & Bull.	45.8	
31	July 26,	Schieffelin Brothers & Co.	42.6	
32	Aug. 13,	Merrick & Bull.	31.7	
33	" "	" "	48.6	
34	" "	" "	25.0	

The assay No. 7 was from a box imported by Mr. James T. Maxwell at the special request of the writer, without limitation in price, and cost here twelve dollars a pound.

The assay No. 21 was from a special importation of four boxes by Messrs. Merrick & Bull, without limitation of price that the writer is aware of. The quantity was $110\frac{1}{2}$ pounds, and the cost was \$10.75 per pound. This quantity required 60 gallons of 95 per cent. alcohol to exhaust the powder, and yielded $87\frac{1}{2}$ pounds of resin of scammony. Taking the cost of drying and powdering the scammony, the labor of extraction, the cost of materials used, and an estimated wear and tear of apparatus, etc., the neat prime cost of this resin was \$14.21 per pound, or about 89 cents per ounce. This is about the average cost of the resin, but is obtained with less trouble the higher the grade of the scammony. It is, therefore, more economical to buy the higher priced scammony.

The last assays and purchases, though of lower grade of value, were at higher prices from the high rates of exchange and the high tariff, and it is probable that after this time the advance will be still greater, so that the scammony represented in the table will hereafter be obtained only at ten to fourteen dollars a pound.

The regulations of the Treasury Department, under the Act of Congress of 1848, "To prevent the importation of adulterated and spurious drugs and medicines," specify that "scammony, when affording 70 per cent. of pure scammony resin," is alone entitled to entry into the United States. See "Regulations under the Revenue Laws, 1857," published by the Treasury Department, p. 158. From this it appears that while it is legally impossible to have imported scammony in this market below 70 per cent. yet, that in fact only three samples out of thirty-four, representing one hundred and fifty pounds out of a thousand, could be found within a period of two and a half years, which really came up to the legal standard; and two of these, representing one hundred and twenty-five pounds, were special importations to order, and would not otherwise have come here. These facts constitute a severe criticism upon the way in which the "drug law" has been executed with regard to a very important drug, and one which is very easily tested. The facts also show that when good scammony is wanted it can, under ordinary circumstances, be obtained at a price nearly corresponding to its true value.

These facts also show conclusively what degree of therapeutic uniformity is to be expected from the use of the best grades of scammony to be found in the market; and the propriety of the step taken by the Committee of Revision of the Pharmacopœia in substituting resin of scammony for scammony in the officinal compound extract of colocynth. The scammony of the forthcoming revision of the Pharmacopœia is required to contain not less than 75 per cent. of resin of scammony to entitle it to be considered officinal.

It appears extremely probable that in the countries where scammony is produced, there is a kind of standard of adulteration, as in the instance of opium, and perhaps other drugs,

whereby it is kept within the limits of 45 to 65 per cent., and that higher and lower grades are produced to order, or, which is the same thing in effect, to suit the price limitations which are almost invariably sent out with the orders of the importers.

The statements of the best authorities concur in giving for the concrete juice of the living scammony plant, when properly dried, a proportion of resin varying from 80 to 92 per cent., and it is highly probable that the importers could, if they would, obtain the drug in this condition.—*Proc. Amer. Pharm. Asso.*, 1862.

Brooklyn, August, 1862.

ON OIL OF SASSAFRAS.

By A. P. SHARP, of Baltimore.

“What are the principal sources of Oil of Sassafras, its mode of manufacture and the quantity produced annually?”

In answer to the above queries I will state, that upon enquiring among the leading drug houses of New York and Boston, I was informed that their chief supply was obtained from Baltimore, hence I have confined myself in obtaining information in regard to the oil more particularly to that city, although I am informed that considerable quantities of it are carried into Philadelphia from New Jersey, and from York and adjoining counties of Pennsylvania. It is brought into Baltimore by small farmers and laboring men who reside in Baltimore, Carroll and Frederick counties, in quantities varying from fifty to five hundred pounds, and purchased by the wholesale drug houses and agents of northern firms for shipment there.

The mode of manufacturing which I have obtained from different persons engaged in the business, is very simple. The roots are dug during the fall and winter, and after being cut into small pieces are placed in a large tub, (or perhaps, more properly speaking, still,) constructed of oak staves and iron hoops, and usually of the following size: six to seven feet high, six and a half feet diameter at base tapering to five feet at the top, upon which is fitted an ordinary helm connecting with the condenser, which is the common copper worm. The tub has resting a few inches above the

main bottom a false perforated bottom upon which the cut root is placed, until the tube is filled with it, and the helm and condenser properly connected, when a stream of steam from any common boiler is introduced, between the two bottoms; this in ascending carries with it the oil, which is condensed in the ordinary manner. The usual yield is one pound of oil from three bushels of the cut root. The quantity brought to market the last year or two has diminished very much from former years, for several reasons. Firstly, the price of the oil became very much reduced, and the increased price of labor induced many to give it up for more profitable employment; and secondly, many of the producers, of the oil have joined the army, and hence the amount of oil brought to the market has fallen off very much. I have, however, endeavored to obtain all the information possible, as to what the yield has been on the average for several years previous to our present troubles, and the amount will reach from fifteen to twenty thousand pounds.

There is another fluid obtained from the root by distillation, on which I hope to give the result of some experiments at our next meeting.—*Proc. Am. Pharm. Association*, 1862.

ON SOME COMPOUNDS OF THE ALKALOIDS OF CINCHONA BARK.

O. Hesse publishes in *Annal. d. Ch. und Pharm.* 1862., May, 226-240, an interesting paper on *Cinchonia*, wherein he compares Schwabe's betacinchonia (see *Amer. J. Ph.* 1861, 417) with cinchonia prepared from bark directly, and from chinoidine, and believes them to be identical. Below we give the most important results.

Cinchonia dissolves at 10° C. in 3810, at 20° in 3670 parts of water. Ether of .7305 spec. grav. takes up at 20° one for 371 parts, while 140 p. alcohol of .852 dissolves at 10°, and 125.7 parts at 20° one part of the alkaloid. Ammonia precipitates it from its solutions in acids, and when dilute, dissolves so little of it that it may be used for the estimation of cinchonia, which after its precipitation is washed with weak ammonia, saturated with cinchonia. Cinchonia, like Schwabe's betacinchonia, is not precipitated by bicarbonate of soda in the presence

of tartaric acid; when heated, however, carbonic acid is given off and cinchonia separated.

Some neutral salts of cinchonia are decomposed by water, particularly when heated; as, for instance, the citrate and acetate. This decomposition of its salts with organic acids on heating must be regarded as the cause why cinchona barks yield a carmine red sublimate. Batka's supposition that they contained the alkaloids in an uncombined state, is without foundation.

The fusing point of cinchonia is generally given at 165°C. ; Schwabe found his alkaloid to fuse at 150° , Erdmann states it to be at 160° . The author observed no alteration of the crystallized alkaloid at 165° ; a portion sublimed at and above 220° , and the remainder fused between 240 and 250° to a brownish liquid, congealing on cooling; the amorphous alkaloid behaved alike.

a. Salts obtained by treating cinchonia in excess with dilute acids.

Hydrochlorate. The crystalline form and the composition of the air-dry salt was the same as Schwabe's. It dissolved in 24 p. water of 10° , 1.3 p. alcohol sp. gr. .85 at 16° , and 273 p. ether sp. gr. .7305 at 16°C. Dried in the exsiccator it loses 3 aq., and at 100° becomes anhydrous.

Nitrate forms on spontaneous evaporation of the aqueous solution large crystals, but separates after heating, in oily drops; it dissolves in 26.4 water of 12°C. and has the composition $\text{C}_{40}\text{H}_{24}\text{N}_2\text{O}_2, \text{NHO}_6 + \text{HO}^*$.

Benzoate crystallizes on cooling of the boiling aqueous solution in small anhydrous prisms combined in stellate groups, soluble in 163 water of 15° .

Sulphate, $\text{C}_{40}\text{H}_{24}\text{N}_2\text{O}_2, \text{SHO}_4 + 2$ aq. dissolves with difficulty in 75 to 78 water; a hot solution remains supersaturated for a long time after cooling; at 13°C. , 65.5 water retain 1 part of the salt in solution, and 5.8 parts of 80 per cent. alcohol at 11° the same quantity.

* The formula for the nitrate and sulphate, in Schwabe's paper, Am. Journ. Ph. 1861, page 420, must be corrected to correspond with the above. Hesse doubles the formula for the sulphate, regarding sulphuric acid = $\text{S}_2\text{H}_2\text{O}_8$, which is bibasic.

Phosphate occurs in concentric groups of prisms, very readily soluble in water, its composition = $2C_{40}H_{24}N_2O_2, PH_3O_8 + 24 \text{ aq.}$

b. Salts obtained by treating cinchonia with an excess of acid.

Acid tartrate, $C_{40}H_{24}N_2O_2, C_8H_6O_{12} + 8 \text{ aq.}$ already prepared and analyzed by Pasteur, dissolves in 101 water of 16° C. , which solution has an acid reaction, and is not troubled by bicarbonate of potassa in the cold.

Acid citrate, $2C_{40}H_{24}N_2O_2, C_{12}H_8O_{14} + 8 \text{ aq.}$ forms small prisms, soluble in 55.8 water at 15° C.

Acid succinate crystallizes from water, partly in long oblique needles, $C_{40}H_{24}N_2O_2, C_8H_6O_8 + 3 \text{ aq.}$ partly in large thick crystals of a similar combination of faces, $C_{40}H_{24}N_2O_2, C_8H_6O_8 + 2 \text{ aq.}$ Both are very soluble in water, have an acid reaction and fuse at 110° to a dark red mass.

c. Salts obtained by double decomposition from the aqueous solution of the muriate.

Hydriodate separates on cooling, as a pale yellow oil, which soon becomes crystalline, and partly in tender white crystals, both of which have the composition already ascertained by Regnault $C_{40}H_{24}N_2O_2, HI + 2 \text{ aq.}$

Hydrocyanate, prepared by Schwabe's direction, possesses the properties described by him, but contains no hydrocyanic acid; the precipitate is cinchonia.

Hyposulphite, $2C_{40}H_{24}N_2O_2, S_2H_2O_6S_2 + 4 \text{ aq.}$ crystallizes in fine white rhombic prisms, and dissolves at 16° C. in 157 water.

Oxalate, $2C_{40}H_{24}N_2O_2, C_4H_2O_8 + 4 \text{ aq.}$ crystallizes in prisms, and dissolves in 104 water of 10° .

Tartrate, $2C_{40}H_{24}N_2O_2, C_8H_6O_{12} + 4 \text{ aq.}$ prepared and analyzed by Arppe, is in small crystals which dissolve at 16° in 33 water. It differs from the acid salt in absorbing again from the air its water of crystallization, expelled by heating; in fusing with greater difficulty, and in the faint alkaline reaction of its solution.

Citrate separates from the alcoholic solution as a colorless oil, congealing to long prisms, arranged in concentric groups, con-

taining $3C_{40}H_{24}N_2O_2, C_{12}H_8O_{14} + 8$ aq. and dissolving in 48.1 water of $12^\circ C$.

Arsenate is in long white prisms, and very soluble in water; composition like the phosphate.

Chromate, $C_{40}H_{24}N_2O_2, HO, Cr_2O_6$ crystallizes from moderately warm solutions in small ocher-yellow prisms, which are decomposed by the light while moist, but are not affected by it in the dry state. From hot solutions the chromate separates as a resinous mass.

d. Salts prepared in different ways.

Tartrate of antimony and cinchonia was obtained by decomposing equivalent weights of sulphate of cinchonia with tartrate of antimony and baryta. On spontaneous evaporation, white crystalline warts are separated first, afterwards large crystals resembling nitrate of cinchonia. These different forms depend on the water of crystallization, the former containing 24.77, the latter 9.94 per cent. Dried at $100^\circ C$. they contain 26.40 Sb and 47.48 cinchonia.

Dr. O. Hesse has obtained a crystalline compound of *oil of anise with quinia*, which separates from the concentrated alcoholic solution of 5 parts of quinia and 1 of oil of anise, and becomes pure and colorless by recrystallization and treatment with animal charcoal. At ordinary temperature, the crystals scarcely smell of anise, but the odor becomes more apparent with a higher temperature, and between 100 and $110^\circ C$. the oil of anise is entirely expelled, together with $4HO$. Muriatic acid converts it into a flocculent or oily mass and combines with the quinia; cold water has no action, but below its boiling point the crystals fuse in it, and oil of anise is expelled; the dry compound fuses above $100^\circ C$. It is very readily dissolved by ether and left on evaporation in the form of prisms and tables. Cold alcohol dissolves but little, boiling alcohol very readily, and separates it on cooling in acute four-sided double pyramids with all the corners cut off. The taste reminds both of quinia and anise. The analysis leads to the formula $2C_{40}H_{24}N_2O_4, C_{20}H_{12}O_2 + 4$ aq.

Analogous compounds of quinia with carbolic acid, creasote, camphor, oil of peppermint, caraway and roses could not be obtained. (Ann. d. Chem. und Ph. 1862, Sept., 382—384.)

R. Hoffmann's process for the introduction of oxygen into the molecule of acetic acid, consists in substituting 1H by 1Cl, Br or I, and replacing the halogen with HO_2 by treating with KO or AgO. Hermann Strecker has endeavored to *oxidize cinchonia* in this way to quinia. He converted muriate of cinchonia into bibromocinchonia, the alcoholic solution of which was boiled with oxide of silver or potassa; the excess of potassa was then neutralized with carbonic acid, the solution evaporated, and the soluble salts dissolved in water. Ether took up but little from the residue, which was recrystallized from hot alcohol and yielded colorless laminæ. Elementary analysis proved the composition to be $\text{C}_{40}\text{H}_{24}\text{N}_2\text{O}_4$.

The base is readily soluble in acids, which solutions do not fluoresce, and yield no green coloration with muriatic acid (undoubtedly a mistake; must read chlorine water) and ammonia. The neutral sulphate and oxalate crystallize readily, the other salts with difficulty; acid salts could not be obtained in a crystallized state.

All the experiments proved the base to be isomeric with quinia and quinidia, but distinct from both; the author has named it *oxycinchonia*. (Ibid. 379—372).

J. M. M.

ACCLIMATIZATION OF SPONGES.

M. Lamiral, whose departure for the coast of Syria with a view to obtain sponges for transplantation we mentioned in April last, has now returned, and presented a detailed report of his proceedings to the Société d'Acclimatation. M. Lamiral distinguishes three kinds of sponges for which there is a demand—the fine soft sponge, called *abiand*; the fine and hard sort, called *achmar*; and lastly, the common sort, called *cabar* by the Arabs. These sponges are found in the Levant within the 36th and 33d degrees of latitude; that is, between Alexandretta and Saïda. It is now universally acknowledged that sponges belong to the animal kingdom, and are an aggregate of cellules built up by gelatinous polypi similar to those which construct madreporæ, porites, and other polypifers. When the sponge is first gathered at the bottom of the sea, it is covered with a black but transparent gelatinous substance, resembling vegetable

granulations, among which microscopic white and oviform bodies may be distinguished. These are the larvæ destined to perpetuate the species. When arrived at maturity, they are washed out by the sea-water which incessantly flows through the sponge; they then swim along, by the aid of the vibrating cilia or hairs with which they are provided, until they reach a suitable rock, to which they attach themselves, and there commence a new life. This emigration of the larvæ from the parent sponge occurs about the end of June and the beginning of July. The fine quality of sponges are chiefly found at the depth of fifteen fathoms or thereabout; the common sponge lies at depths varying between twenty and thirty fathoms. At Tripoli (on the coast of Syria, not of Africa) M. Lamiral engaged some divers, who commenced operations on the 21st of May. The sponges gathered were immediately placed in boxes, through which a stream of sea-water was constantly made to flow, the animal matter being, of course, left on them, and protected from injury. These sponges arrived at Marseilles on the 17th of June; thence they were taken to Toulon and the islands of Hyères, where stone troughs, with five sponges in each, were sunk in different places. The success of the experiment will not, of course, be known until next season.—*Phar. Jour. Lond.*, October, 1862, from *Times*, Sept. 26th.

ON THE EXISTENCE OF ANILINE IN CERTAIN FUNGI, &c.

By DR. T. L. PHIPSON, F. C. S., &c.

In this paper the author refers to some experiments upon the action of organic matters upon oxygen, which he published about two years ago, and which tend to show that, whenever an organic substance is oxidised in nature, the oxygen is in the state of ozone. This state is excited by the presence of a ferment. For instance, when an apple is cut in two halves, the tissue exposed to the air becomes brown in a short time; this coloration is owing to ozone acting upon the tissue. Ordinary oxygen will not produce it; moreover, the presence of a ferment in the tissue is necessary to ensure the transformation of oxygen into ozone. If a solution of guaicum, or of iodide of potassium and starch, is placed upon the freshly-cut surface of

the apple, these reagents immediately show the presence of ozone. If the apple be heated to 100° C., so as to destroy the ferment, no ozone is formed, and the coloration will not occur. The author then proceeds to examine the cause of the coloration of certain fungi (*Boletus luridus*, *Boletus cyanescens*, &c.), which become blue when they are cut and exposed to the air. This coloration is also due to the action of ozone, induced by the presence of a ferment; and the substance upon which the ozone acts appears to be acetate of aniline. Alcohol extracts the latter, together with a variety of other substances, which, however, do not prevent the characteristic reactions of aniline, such as the action of chloride of lime, &c., to be distinctly obtained with this liquid. When the fungi are previously boiled to destroy the ferment, no ozone is formed in contact with the air, and, consequently, no coloration occurs. The author states that Professor Schoenbein first remarked that ozone was active in the coloration of these fungi.—*Chem. News, Lond., October 18, 1862.*

ON THE CULTIVATION OF EGYPTIAN OPIUM.

BY MR. S. STAFFORD ALLEN.

In the course of a voyage on the Nile last winter, an opportunity was afforded of examining the process of manufacturing Egyptian opium, and though the whole affair is so simple and previously well-described as to be scarcely worth mentioning, the observation of an eye-witness may possibly interest some of your readers.

The town of Gheuch is situated on the Nile, about 400 miles above Cairo, and celebrated for the manufacture of the earthen "goollehs," a sort of porous water-bottle much in use throughout Egypt.

Near this place I observed several fields (mostly small) of white Poppies (*Papaver album*), which I was informed were grown for Opium; and being curious to see the process by which this important article is produced, I paid a visit to one of them.

The poppy itself is called by the Arabs "Abou Nome," or the "father of sleep" (the term "abou" being generally used

in the Arabic language, in conjunction with any remarkable quality or feature, to indicate a person or thing.) The opium itself is distinguished by the name of "fiuw." As soon as the head has attained a good size, and before it has begun to dry, a long incision is made with a knife, running twice round it in a horizontal direction. From this incision a yellowish milky fluid exudes, in the form of small tears, becoming darker and harder by exposure to the sun.

This is collected every morning on a sort of rough scoop knife (all tools in use amongst the Arabs being of the rudest description,) and the produce of several gatherings added together on a leaf, where they form a flat cake, which is then placed in the sun to harden.

Each head is scraped four or five times, after which it is exhausted, and is then cut and dried for seed.

The quantity procured from each head is almost infinitesimal, and the amount of a whole day's gathering exceedingly small.*

The opium manufactured here is not exported, and no more is grown than is required for home consumption.

Professor Bentley stated that the opium forwarded by Mr. Allen was unlike the ordinary commercial Egyptian opium. The present was covered by a poppy-leaf, whereas commercial Egyptian opium was enveloped in a leaf with radiate veins, the origin of which was unknown, but which he believed was derived from *Platanus orientalis*. The present specimen much resembled the small Constantinople opium in flat cakes of Guibourt (see Pereira's *Mat. Med.* 4th ed. vol. ii. part 2, page 600.)—*Phar. Jour. Lond.*, Nov. 1862.

ON THE PREPARATION OF METALLIC BARIUM.

BY WILLIAM CROOKES.

In the last number of the *Philosophical Magazine* will be found a note by Mr. C. W. Vincent on the preparation of chromium, and one by Mr. W. B. Giles on the preparation of manganese; the reduction in each case being effected by allow-

* A specimen of opium procured at the above-mentioned place accompanied this paper.

ing sodium-amalgam to act upon an aqueous solution of the respective chlorides, removing and drying the new amalgam which forms, and then distilling off the excess of mercury. It may be interesting to know that this method is capable of very general application. Not only can salts of most of the heavy metals be reduced to the metallic state in this way, but also those of the alkaline earths. The preparation of barium is especially easy. To a saturated aqueous solution of chloride of barium sodium-amalgam is added. The whole is then heated to about 200°F. , and in a few minutes the replacement of sodium by barium will be complete. Scarcely any gas is evolved, but the amalgam increases in bulk, becomes of an iron-grey color, and, upon examination with a lens, is seen to consist of a mass of glistening metallic crystals. In order to make sure of the removal of the whole of the sodium, the supernatant liquid may be poured off, and the amalgam boiled with fresh chloride of barium. A little hydrogen will now be evolved, and the barium amalgam must be transferred to a dish of water, and kneaded with the fingers under a tap for a minute or so, to get rid of salts. It must be dried and squeezed in a cloth, to remove excess of mercury. In this state barium amalgam forms a very heavy crystalline mass, which, when kneaded between the fingers, has very little cohesion, but breaks up with a grating sound into a crystalline powder; it tarnishes slowly in the air, and decomposes water.

To prepare the pure metal from this, it is placed in a hard glass tube retort, and covered with naphtha, the open end of tube being nearly closed by a cut cork; the naphtha and the mercury are then distilled off, the heat towards the latter part of the time being raised to redness by a blow-pipe. The barium rapidly attacks the glass at this temperature, and if this temperature be maintained too long the resulting metal will contain silicium. The tube is then allowed to cool, and the end cut off. The metallic barium will form a fused mass at the end of the tube; it must be quickly removed to naphtha, as it appears to tarnish as readily as potassium. To get the true color of the metal it must be scraped under naphtha; it will then be seen to possess a brilliant white, metallic lustre. Exposed to the air for even a few minutes, it crumbles to powder, which gradually becomes white, consisting then of baryta; thrown into

water it sinks instantly, evolves hydrogen violently, and forms baryta-water. When heated in a spirit-lamp it burns like iron filings, the light being a mixture of red and green. The properties of the metal are in these, as well as in other, respects, identical with those given by Sir Humphrey Davy.—*Chem. News, Lond., October 18, 1862.*

PHOSPHOMOLYBDIC ACID AS A TEST FOR ALKALOIDS IN MEDICINAL PREPARATIONS.

BY FRED. F. MAYER, of New York.

As one of the questions allotted to me at the meeting of this Association in 1860, stands on your list an inquiry into the practicability of a volumetrical assay of the narcotic extracts by means of the test known as phosphomolybdic acid, generally called Sonnenschein's test, and the paper which I present to you at this meeting is an attempt at a reply thereto.

At the time when I undertook this reply, I was not aware that another chemist had been engaged on the same subject, and in the same direction, nor what results he might have arrived at. But as I was informed last year by Prof. Maisch, a pupil of his in Philadelphia, Mr. Hayes, of Georgia, had undertaken to examine the value of phosphomolybdic acid for the same purpose. Prof. Maisch could not, however, give me any data as to the conclusions Mr. Hayes had arrived at, and being unable to communicate with the gentleman, as well as unwilling to deprive him of the merit belonging to him, I concluded upon entering only into a general examination, the more so as I have never been very favorably impressed with any belief in the practicability of the test for volumetrical analysis.

For, the relative value of a method of wet assay depends not so much on the extreme nicety of the reaction which is required in chemical analysis by weighing; but in the readiness of the means with which the reaction is brought about. Another requisite of a volumetrical method is that the assay be not interfered with by other ingredients of the liquids acted on, which might produce similar results or render the reaction indistinct.

It always appeared to me that phosphomolybdic acid was inapplicable for every one of the reasons just given.

This compound was introduced by Struve and Savanberg, as a test for the presence of ammonia in acid liquids, and to this day is used for this purpose, as is the molybdate of ammonia in testing for phosphoric acid. Its preparation, quoting Sonnenschein, is as follows :

“Molybdate of ammonia is precipitated by common phosphate of soda ; the yellow precipitate, after being well washed, is suspended in water and heated with carbonate of soda until dissolved. This solution is then evaporated to dryness, and calcined to drive out every trace of ammonia. In case the molybdic acid should in part have been reduced during this process, the whole must be moistened with nitric acid, and again calcined. The resulting salt, when cool, is then warmed with water ; nitric acid is added in excess, and the strongly added solution diluted with water, in such a proportion that the resulting liquor should contain 10 per centum of the dry salt. The golden colored liquid must be kept from the influence of ammoniacal vapors.”

After this reagent had been established by Sonnenschein as a test for ammonia or any of its salts, De Vrij, in 1853, first noticed that it produced a similar reaction, not only with ammonia, but also with alkaloids, and in 1857, Sonnenschein without crediting De Vrij, published the same as an extension of the original test, for the determination of the amid-bases derived from ammonia, as well as all the alkaloids, which had come under his observation, (*Ueber ein neues Reagens auf Stickstoffbasen, Berlin, E. Kuhn, 1857,*) and an abridged account of his paper was republished in the *London Pharmaceutical Journal*, and the *American Journal of Pharmacy* for 1858.

As regards delicacy of reaction this test leaves nothing to be desired, and is in this regard exceeded only by Scheibler's metatungstic acid.

Not to mention, however, the costliness of the reagent in either case, which would in itself be sufficient to preclude its adoption for general analysis, there is one great objection to its use, and this objection in all probability has prevented Sonnenschein from giving the quantitative application of the test which

he promised when publishing the qualitative—it is, that a precipitate with phosphomolybdic acid always leaves us in doubt as to whether it be caused by an alkaloid or by ammonia, or one of its compounds; appearance, texture and color in nearly all cases differing very little, which difference in colored solutions amounts to nothing.

This I consider the fatal objection to the reagent in its application for the testing of narcotic extracts. An extract containing as much of a salt of ammonia as it should of its proper alkaloid, if phosphomolybdic acid were used for quantitative precipitation, would show the same strength as a good extract. There would therefore be no safeguard against error or fraud. But it is a question as yet whether of all narcotic extracts, and extracts generally containing nitrogenous compounds, ammonia or some of its salts does not form a constituent.

We know how liable the alkaloids of Belladonna, Stramonium, Conium and Hyoscyamus, are to decomposition during their preparation, and that ammonia is always a product of such decomposition; and it may be safely assumed that it is a constituent of all narcotic extracts—preparations which have to undergo so much manipulation and exposure to extraneous influences.

An experiment made in this direction gave me a doubtful result; but as the method employed is capable of improvement, and the point well worth examining, I can only promise to continue the experiments.

A few grammes of Extr. Belladonnæ (English) diffused in water, were mixed with dilute caustic soda lye, and placed in a flask, through the cork of which passed first a tube conveying a current of washed hydrogen gas; and secondly, a tube provided with a large bulb, the upper end of which was connected with a bent tube passing into a flask with dilute nitric acid.

The purpose was to obtain, if possible, the most volatile product of the action of the caustic alkali on the extract in an atmosphere of less density than that of the atmospheric air, free from the products of that action at a higher temperature; the bulb tube to retain anything condensable, other than gas.

Belladonna and its extract, when mixed with a fixed alkali, evolves an odor closely resembling that of conia. The current

of gas after passing through the bulb tube, but before reaching the acid, possessed the same odor and gave white fumes with acetic acid, and the nitric acid into which the gas was afterwards conducted for a considerable length of time, gave a faint reaction with phosphomolybdic acid. The question is therefore unsettled, whether these fumes with acetic acid arise from ammonia, or from the substance which causes the narcotic odor of the extract and of impure atropia; and my experiments in that direction are not yet concluded.

The third objection, and which relates especially to the application for which the test is wanted, is that phosphomolybdic acid, when brought into a solution of an extract, however the same may be acidulated with nitric acid, is decomposed, the green modification of molybdic oxyd being one of the products, which produces not only a green precipitate, but also a deep green, cloudy liquid in which no test-reaction can be observed with any degree of safety. The action of the saccharine or mucilaginous constituents of the extracts is in this case similar to that of most other deoxydising agents, but appears not to be overcome even by the presence of nitric acid.

For one purpose, however, and this is one of the applications I believe Mr. Hayes has made of the test, it may be valuable to the pharmacist; this is in determining, during displacement or extraction of a vegetable drug, the point of its exhaustion. In liquids containing but little extraneous organic matter, the reaction, after acidulating with nitric acid, shows itself distinctly enough; but in such where the organic non-nitrogenous matter preponderates, phosphomolybdic acid cannot be used, at least as a quantitative test. These we may presume are some, if not the principal reasons, why the test has not been further extended in its application.—*Proc. Am. Pharm. Association*, 1862.

ON CHESTNUT LEAVES IN WHOOPING-COUGH.

BY GEORGE C. CLOSE, of Brooklyn, N. Y.

I wish to call the attention of members of the Association to an article, not recognized in the Pharmacopœia, and the use of which as a medicine has only recently come to my knowledge.

This article is the leaf of the common chestnut tree, (*Castanea vulgaris*.)

Having a child whom I supposed to be affected with incipient whooping-cough, I asked a prominent physician of New York, who has had an extensive practice for more than thirty years in the city, what he thought was the best remedy for whooping-cough? He answered, chestnut leaves are by far the best remedy I have ever met with. Upon this, I immediately commenced giving to the child an infusion of the leaves made with boiling water and sweetened with sugar. She drank it freely and without objection, the taste not being unpleasant. The cough, which had continued for two weeks, and was evidently growing worse previous to giving the remedy, was immediately relieved, and after two or three days ceased entirely, and has not returned though several months have passed.

Since making this trial, when asked by customers, "What is good for whooping-cough?" I have advised them, if they had no physician in attendance, to try the leaves. In several instances after trying them, they have reported to me that "they acted like a charm," and gave immediate and great relief.

I have also heard of cases of adults, who were affected with that kind of spasmodic cough, which is sometimes caused by some (perhaps slight) source of irritation in the throat, being immediately relieved by the same remedy.

As I have, occasionally, calls for chestnut leaves, I asked a person who applied for them a few days since, for what purpose he used them? He replied, as a remedy for whooping-cough, for which they were very good, and that they often relieved other kinds of cough also. This shows that their use is becoming somewhat popular as a domestic remedy.

A very extensive use of an article is required, however, to test its real value as a remedy, and I only present the foregoing facts as warranting, in my judgment, farther trials of the leaves.

I also present a specimen of the dried leaves procured green and cured by myself, and a sample of fluid extract made from the powdered leaves in the usual way, using diluted alcohol as a menstruum.

Although the use of chestnut leaves as a remedy is new to me,

it may not be to all the members present, and if any of them can give further information upon the subject, I hope they will do so for the benefit of the Association.—*Proc. Am. Pharm. Association*, 1862.

ON THE ACTION OF SELENIC ACID ON ALCOHOL.

BY M. CHR. FABIAN.

By evaporating a weak solution of selenic acid, and raising the temperature to 265° , an acid is obtained containing about 83 per cent. of anhydrous selenic acid. In presence of concentrated sulphuric acid *in vacuo*, the density of the acid can be raised to 85 per cent. of anhydrous acid. Monohydrated acid contains 87.7 per cent of it.

Selenic acid concentrated *in vacuo*, and put in contact with its weight of absolute alcohol, becomes strongly heated. By raising the temperature ether is distilled, and at 169° C. reaction occurs, and the apparatus becomes filled with a dark green gas which condenses into white prisms of selenious acid. The other products of this reaction are formic acid, carbonic acid, oxide of carbon, aldehyde, and a small quantity of acetic acid.

Ethylselenic acid is obtained by heating for a certain time at 100° C. equal parts of selenic acid, and alcohol, diluting with an equal quantity of water, saturating with carbonate of lead, filtering, evaporating to one half, *in vacuo*, and precipitating the lead by selenic acid, and then by sulphuretted hydrogen. The ethylselenic acid obtained in this way cannot be concentrated without decomposition. Left to itself, it rapidly separates into selenic acid and alcohol.

Ethylseleniates are also unstable. They are all very soluble in water, less so in alcohol, and insoluble in ether. They are isomorphous with the corresponding ethylsulphates, with which, mixed in every proportion, they crystallize.

The author has prepared salts of potash, baryta, strontia, lime, lead, copper, and silver.—*Chem. News*, October 4th, 1862, from *Annalen der Chemie und Pharmacie*.

PURITY OF FROZEN WATER.

M. Robinet has made a variety of experiments to ascertain how water is freed from saline impurities by congelation; and his results go to show that the small amount of lime and magnesian salts in potable waters is forced out in the act of freezing as completely as the more soluble salts present in sea water. Frozen water, he says, is so far purified that it may, in most cases, be used for chemical purposes in place of distilled water. In reference to this, M. Martens adds, that in his photographic excursions among the Alps he found that he could always use the waters from the glaciers instead of distilled water, but that dissolved snow did not answer.

Dr. Rudorff has also made experiments on the freezing of saline solutions (*Bericht. d. Akad. der Wissensch. zu Berlin*, 1862, s. 163.) He employed the platino-cyanide of magnesium, the solution of which is colorless; but he found that when the solution was frozen so far that the water left was not enough to hold the salt dissolved, crystals of the well known beautiful appearance were formed. Other curious results were observed with a supersaturated solution of sulphate of soda. When such a solution was cooled below the freezing point and the formation of ice prevented, it was found that a piece of ice dropped in determined the formation of ice, while a crystal of the salt caused the formation of crystals of the salt. A very small piece of the salt dropped in with ice caused the separation of the whole of the salt. He noticed, too, that the lowering of the temperature produced an alteration in the constitution of the solution. For instance, when a solution of the blue salt, $\text{CuCl} + 12\text{HO}$, was frozen, the unfrozen water contained the green salt, $\text{CuCl} \times 4\text{HO}$. Other curious results will be found in the paper referred to.—*Chem. News, London, Oct. 4, 1862.*

ALBUMINATE OF IRON AND SODA AS A THERAPEUTIC AGENT.

BY ANGELICO FABBRI.

Simple contact, at the ordinary temperature of the atmosphere, of white of egg with a salt of iron and soda, is capable

of instantly producing a soluble albuminate of iron and soda, or an albuminferrate of the alkaline base. The chemical combination of this compound is such that it is not altered by the yellow ferrocyanide of potassium, the most delicate test of the salts of iron, unless a few drops of acid—as, for example, the hydrochloric—be previously added to the soluble albuminate; thus proving that this decomposition cannot be effected by the agency of the alkalies, but only by some acids, since the potassium of the cyanide is not able to displace the oxide of iron, becoming oxidized at its expense, and setting the metal free, as occurs with the other ferruginous preparations. Considering that we find in the blood, albumen, soda in excess, and iron, and having shown how these three bodies, by simple direct contact, form a soluble salt, the chemical combination of which is so powerful that it is not destroyed by the most delicate reagent, may we not fairly infer that the iron exists in the blood as an albuminate of iron and soda: and would it not therefore be reasonable to administer iron in the various diseases in which it is prescribed, principally in reference to the state of the sanguineous system, in the form of albuminate, as that in which nature itself has placed it within our organism—one of the products, so to speak, on which our life depends. When I read in works of chemistry that the yellow ferrocyanide of potassium is not capable of demonstrating the presence of iron in the blood until a stream of chlorine has first been passed through the latter to destroy its coloring matter, I am confirmed in the opinion that the iron exists in that fluid as an albuminate of iron and soda, because this salt, requiring the addition of an acid to render it capable of detection by the cyanide, is supplied with it by the chlorine, which, in destroying the organic coloring matter becomes converted into hydrochloric acid by uniting with their hydrogen. Physicians have been long puzzled, and are still at a loss, how to administer iron, a most valuable remedy, in the manner most suitable to the internal organism; hence the great number of preparations of this metal. Some object to its saline combination with mineral acid on the ground that these are inorganic, and they prefer giving it in the metallic or oxidised state, leaving the acids of the stomach to form with it compounds which may be carried into the circulation. Others, un-

willing to run the risk of having the greater part of the iron—little or not at all acted upon—expelled with the feces, prescribe it in the saline state, but combined with organic vegetable acids, hence we have the malate, tannate, citrate, &c., of iron. Others still more scrupulous, wish to have it united to acids of an animal nature, and prefer the lactate, the cyanide, &c., and I, going still farther, would recommend its employment in the state of albuminate of iron and soda, requesting physicians to take into consideration what I have advanced, and to ascertain if practice will in this instance corroborate theory.

In preparing the albuminate of iron and soda, I employed the following process: Take 112 grs. of caustic soda, and 104 of sulphate of iron. Having dissolved both in a sufficient quantity of distilled water, let the solutions be poured on the whites of four eggs previously beaten up; let all now be shaken together and poured upon a filter to separate the hydrated oxide of iron which has precipitated, since all the iron is not in this case converted into albuminate. To the filtered liquid, which now contains, in addition to the albuminate, sulphate of soda, formed by the decomposition of sulphate of iron by the soda present in excess, lime water is to be added, to decompose the sulphate of soda, by which an insoluble sulphate of lime is precipitated. To separate the latter, the mixture is to be again filtered; and as the filtered fluid will contain an excess of lime, it is to be subjected to the action of a stream of carbonic acid, care being taken to avoid using an excess of the latter, and again filter to get rid of the insoluble carbonate of lime thus formed. The filtered fluid is now to be allowed to evaporate in a wide, shallow vessel, and with the aid of the heat of a stove, until it is reduced to a pint. A clear orange yellow, slightly saltish, chalybeate solution is thus obtained, which, as already mentioned, does not give a precipitate with ferrocyanide of potassium without the addition of an acid. Each ounce of this liquid contains, approximately, four grains of the albuminate, *plus* an excess of albumen and soda, as may be seen by referring to the process employed; the solution consequently has a slightly alkaline reaction. It is desirable that the soda should thus be present in excess in order that the compound shall be conformable to the state in which it exists in the blood, where

we find the albumen rendered alkaline by an excess of soda. This albuminate of iron and soda is represented by the following formula : $C^{30} H^{50} O^{10} + HO + Fe^2O^3 + NaO + 2HO = AL, Fe^2O^3, NaO + 2HO$ water. As the albumen loses a portion of its nitrogen in order to be converted into albumic acid, we must suppose that a portion of the soda by its presence determines the formation of a fatty matter at the expense of other principles of the same albumen, and then becomes saponified. I have given the formula of the albuminate of iron and soda above, neglecting the excess of the albumen, which though united to the liquid, perhaps with some other soluble salts of the albumen of the egg, (chlorides,) I do not consider to form a part of the saline compound, which may be obtained in radiated crystals by evaporating the solution to dryness.—*Journal of Rational Medicine*, May, 1862.

NEW PROCESS FOR THE MANUFACTURE OF NITRIC ACID.

M. F. Kuhlman *filis* has recently shown that when nitrate of soda is heated with chloride of manganese, a mixture of nitrous acid and oxygen is disengaged, which, by passing through water, furnishes nitric acid; while common salt and a high oxide of manganese are at the same time formed. The decomposition of the two salts commences at a temperature at about 230° Cent., and that the heat has to be carefully maintained at that point. The reaction which then occurs may be thus expressed :



The oxide of manganese produced may be regarded as a compound of $3MnO_2$ with $2MnO$.

The two salts are heated in a stone retort, and the mixture of peroxide of nitrogen and oxygen is passed through water contained in a series of vessels. The nitric acid is formed when the gases are brought into contact with the water, some binoxide of nitrogen being at the same time evolved, due to the excess of nitrous acid splitting up into nitric acid and nitric oxide. This binoxide coming into contact with the air in the condensing vessels, takes fresh oxygen, and is again absorbed. It

is important, therefore, to avoid loss, to maintain a sufficient quantity of air in the arrangement.

M. Kuhlman has found, as the mean of a great number of operations, that 100 parts of nitrate of soda will furnish 125 to 126 parts of nitric acid of 35° strength. This yield closely approaches to that obtained by the ordinary process (127 to 128 per cent.) The oxide of manganese remaining after the reaction may be used for the generation of chlorine, by which it is again converted into chloride of manganese suitable for another operation.

Other chlorides, such as those of calcium magnesium, or zinc, are also capable of very definite decomposition by means of nitrate of soda; chloride of sodium and an oxide of the metal being formed.

Sulphate of manganese also decomposes the nitrate, yielding the same product as the chlorine, excepting that sulphate of soda replaces the common salt. The yield of nitric acid is practically the same. The reaction will also take place with sulphate of lime, but a high temperature is required; one hundred parts of nitrate of soda yielding by this treatment ninety parts of nitric acid of 35°. The residue consists of a mixture of sulphate of soda and lime.

M. Wœhler had previously indicated that a mixture of bin oxide of manganese and nitrate of soda when moderately heated, furnish no manganate, but a large quantity of caustic soda; and even recommended the reaction as suitable for the preparation of caustic soda. M. Kuhlman has applied it to the manufacture of nitric acid. He finds the yield to be about the same as that obtained by the plaster of Paris method.—*Lond. Pharm. Journ.*, Oct., 1862.

ESTIMATION OF TARTARIC ACID.

The determination of the amount of tartaric acid contained in the mother-liquors from which it is prepared, offers to the manufacturer certain difficulties, on account of the number of foreign bodies with which it is mixed. M. Guido Schnister, having remarked that the acid tartrate of potash is almost insoluble in citric acid, has founded upon this property a method for the estimation of tartaric acid.

These mother-liquors ordinarily contain iron, alumina, magnesia, sulphuric acid, etc., and tartaric acid. To determine the amount of this last acid, the liquid is saturated with caustic potash or pure carbonate of potash, filtered to separate the metallic oxides which are precipitated, and an excess of citric acid added. The acid tartrate of potash is collected on a filter, washed with alcohol and weighed. One hundred parts of cream of tartar correspond to 79.9 of tartaric acid. The author has verified this process by several trials, and obtained correct results.—*Lond. Pharm. Journ.*, Oct., 1862.

ON THE ACTIVE PRINCIPLES OF VERATRUM VIRIDE.

By G. J. SCATTERGOOD, of Philadelphia.

“Is the sedative action of *Veratrum Viride* due to the veratria known to exist in it, or is there another principle contained in the root to which the action is due?”

In order to decide this question I have attempted to isolate the active principles of the root, and to try their effects separately upon the animal system.

These appear to be, Firstly: *Veratria*. Secondly: An alcoholic resin.

They are obtained in the following manner: The finely ground root is exhausted by the smallest possible quantity of strong alcohol. This tincture is slowly poured into a larger bulk of water, and the mixture exposed to a gentle heat to drive off the alcohol. When this is done, the liquid is raised to the boiling point, and immediately filtered. The resin remains in the filter, while the veratria which appears to exist in this drug in a form soluble in boiling water, is found in the filtrate, from which it may be precipitated by the addition of ammonia. The alkaloid thus obtained is contaminated by another substance of a similar nature to veratria, but insoluble in ether, from which it may be separated by treatment with that menstruum, the veratria being left upon its evaporation, of a yellowish color—requiring further purification. The other substance remains in the residue, and may be extracted from it and obtained in the form of a brownish adhesive mass, by the action of strong alcohol. It is somewhat

soluble in water, but precipitated from its aqueous solution by muriatic acid. This solution froths considerably when shaken: Sulphuric acid is colored orange yellow by it. Muriatic acid a delicate red. It appears to be a compound of ammonia with one of the organic acids derived from the root. Its medicinal effects were not examined.

The medicinal properties of the two active principles before alluded to have been tested principally by experiments upon dogs. In this part of the examination I have been very much assisted by Dr. Saml. R. Percy, of New York, who has kindly tried several experiments at my request, and furnished me with a detailed account of them. As this shows the effects of these two articles in a form very suitable for comparison, it is here subjoined without much abridgement.

Exp. 1. One-third of a grain of veratria prepared from the Veratrum Viride was given to a large dog weighing about 30 lbs. in gelatine capsules, care being taken that none of it escaped.

At 3:35 P. M., pulse 150. 4:00 P. M. salivation very profuse, pulse 148. 4:05, vomiting produced. 4:20, vomiting continues very frequently, pulse 140. 4:45, vomiting viscid mucus and bile, pulse 128. 5:20, prostration very great, unable to stand, pulse 122. 5:45, pupils widely dilated, eyes fixed, pulse 122. 6:00, prostration great, profuse salivation, pulse intermittent. 9:00, walking about, but very sober and dejected, pulse 112.

Three days afterwards the same dose was repeated to this dog, with very similar results. The pulse was not much depressed, the prostration was very great, and there was almost total loss of power in the voluntary muscles.

Exp. 2. To a dog weighing 20 lbs. $1\frac{1}{2}$ grain of the resin dissolved in alcohol was administered. At 11 A. M., pulse 144. At 12, salivation produced, pulse 124. 12:20 P. M., pulse 96. 12:25, vomited many times, the vomited matter being viscid and ropy, pulse 80. 12:50, pulse 80. 1:10, pulse 74. 1:40, profuse diuresis, no dilatation of pupils, pulse 70. 3:35, P. M. quiet, pulse 40.

Exp. 3. Half a fluid dram of the tincture of the resin of Veratrum Viride, containing one and a half grains, was thrown by hypodermic injection into the side of a large dog weighing about

30 lbs. at 11·45 A. M., pulse 165. 11·56, saliva flows freely, purged, restless, pulse 106. 12·05 P. M., vomiting frequently viscid mucus and bile 12·15, purged again, vomiting, pulse, 60. 12·30, pupils widely dilated, vomited clear bile, pulse 52. 12·40, made an incision down to the femoral vein to which he made no resistance and seemed to be unconscious of pain, pulse 41. 12·44, injected 20 minims into femoral vein, death was almost instantaneous. Both sides of the heart were *full* of bright chocolate colored blood; the liver was gorged with dark blood, mucus coat of the stomach was greatly congested, the other organs were healthy.

Exp. 4. Half a fluid dram of the tincture of the resin Veratrum Viride containing one and a half grains, was thrown into the stomach of a dog weighing about 25 lbs. at 11·15 A. M., pulse 140. 12·10 P. M., additional 20 minims were given, equivalent to one grain of the resin, pulse 117. 12·20, free salivation, pulse 110. 1·00, vomited many times in quick succession, the matter last thrown up being tough and ropy, and containing mucus and much bile; the vomiting was painful and prostrating, pulse 80. 1·15, pupils fixed, pulse 76. 1·45, profuse diuresis, and salivation, pulse 72. 1·47, vomiting mucus and bile, pulse 72. 3·30, sleeping, pulse 70.

The foregoing experiments upon dogs of about the same weight indicate a very great similarity in the general therapeutic properties of the alkaloid and the resin. In each of these cases a great increase of the saliva, prolonged emesis, general prostration and reduction of the pulse were produced; and in every case but one dilatation of the pupils also. But it will be noticed that this reduction of the pulse, was much greater in those cases when the resin had been administered, than in that in which the alkaloid was given. In the former being from 165 to 41; from 144 to 40; and from 140 to 70; while in the latter it was reduced from 150 only to 112. In another instance in which the same alkaloid prepared by Dr. Percy, by purifying the commercial veratria, was administered in the dose of one-third of a grain, to a dog weighing 25 lbs., the pulse was likewise only moderately reduced, viz: from 132 to 100, the attendant effects being very much the same as those just described.

Judging from these parallel experiments, and from the fact that the resin exists in very much larger quantity, than the alkaloid, in this drug, it would appear that the sedative action of *Veratrum Viride* is due in greater degree to the alcoholic resin it contains than to its veratria.

I may add that the action of the resin upon the human system produces results very similar to those just described. On the 14th inst. at 5:15 P. M., I took two grains of the alcoholic resin. Pulse 80. At 6:45, its effects were first apparent in slight spasmodic contractions of the muscles of the leg—these soon passed off and were not afterwards noticed. At 7:45, free vomiting began, accompanied with an increased flow of saliva and general perspiration; the vomiting continued at intervals for upwards of an hour, and until considerable bile had been thrown up; and was followed by painful retching: at 8:45, pulse 60—by this time the feeling of warmth had been succeeded by general coldness of the body and loss of strength. At 9:15, pulse 55. At 9:30 fell asleep. The only effects observed in the morning were general weakness, and a somewhat depressed pulse. No tingling of the skin so frequently occasioned by veratria, nor catharsis, were produced.

The resin thus experimented with is of a soft consistence, and of a mild, oily, though nauseous taste at first, but leaving after some time a somewhat acrid sensation in the fauces. It is of a brownish-black color. It yields to ether its more oily portion, about one-quarter its weight,—the remainder, insoluble in that menstruum, is left of a harder and more friable consistence. In order to remove any suspicion that the medicinal action of the resin was due to a minute quantity of the alkaloid remaining in it, I administered three-quarters of a grain of the residue left after treating the alcoholic resin with ether, (which would have removed any veratria if present,) to a half grown cat. Its effects were very similar to those of the alcoholic resin before mentioned, vomiting, dilatation of the pupils, slight spasms of the muscles, slow breathing, and reduction of the pulse from the neighborhood of 100 to 42, were produced in the course of a few hours.

The quantity of resin obtained from 1 lb. avoird. of the dried root of *Veratrum Viride* may be stated at about 300 grains—of vera-

tria about 30 grains. From its reaction with sulphuric acid, the tinct. iodine test, and a solution of the iodo-hydrargyrate of potassium, I am of the opinion that it may perhaps be an altered form of veratria. I have not succeeded in detecting the presence of sabadilla. The existence of jervia in the filtrate from which the veratria was precipitated, was thought probable from the white precipitate which was produced in it upon the addition of sulphuric acid.—*Proc. Am. Pharm. Association*, 1862.

RENNET WINE.

Dr. Geo. Ellis states (*Dublin Med. Press*, July 16; 1862) that about two years since, having failed to obtain benefit from the preparation called pepsin, he had recourse to the direct preparation of a solution of gastric juice from the calf's stomach, and with the most satisfactory results. His mode of preparing is as follows: "Take the stomach, or rennet bag as it is called, of a calf fresh from the butcher; cut off about three inches of the upper or cardiac extremity, which portion, as it contains fewer glandular follicles, may be thrown away; slit up the stomach longitudinally; wipe it gently with a dry napkin, taking care to remove as little of the clean mucus as possible; then cut it into small pieces (the smaller the better), and put all into a common wine bottle; fill up the bottle with good sherry, and let it remain corked for three weeks. At the end of this time it is fit for use.

"*Dose*.—One teaspoonful in a wineglassful of water immediately after meals.

"*Test of Quality*.—One teaspoonful will solidify, to the consistency of blancmange, in from one to two minutes, a cup of milk (about eight ounces) at the temperature of 100° Fahr.

"In this action on the casein of the milk, it may be said that that the wine itself might have some effect. This, however, cannot be the case, as wine will not solidify milk, and it will only curdle it at a much higher temperature, and in larger proportion.

A single dose of this preparation, which Dr. E. calls rennet wine, given daily after dinner, will, he says, "be found quite sufficient to act speedily and effectively, without other treatment,

in the common run of cases of functional disorder of the stomach. It is not, perhaps, easy to explain the operation of this small quantity when we consider the large supply of the gastric secretion required for the thorough digestion of an ordinary meal. The action is probably due to those indirect chemical changes called catalytic transformations, which some organic substances, by their mere presence and contact, induce in each other, and in other proximate principles. Thus the conversion of a small portion of food in the stomach into healthy albuminose by this small quantity of sound gastric juice, may induce the same healthy action throughout the stomach contents during the entire process of stomach digestion. It is at least equally difficult to explain the action and rapid extension of ferments generally in their appropriate solutions. I have often been forcibly struck by the material effect of this small dose in removing offensive odor from the breath of young persons—a distressing symptom sometimes aggravated rather than relieved by purgative medicine; and I may also mention that in one of these cases cod-liver oil was easily tolerated afterwards, though never before.”—*Am. Jour. Med. Sci.*

CASE OF POISONING FROM THE POLLEN OF THE COMMON YELLOW TIGER LILY.

Dr. Jeffries Wyman read the following report of a case by Dr. R. T. Warren, of Waltham, Mass.:

“Mrs. B. was making a call at a neighbor’s, having with her a little daughter 4 years old. The child was ‘perfectly well,’ the mother said, and had been so. It played with another little girl, and did not go out of the room during the call. The little girl came to Mrs. B., requesting her to go and see Fanny, the name of the child. Mrs. B. went, and found Fanny rubbing her nose very violently. Soon there was a profuse discharge of mucus from the nose, colored yellow. The mother questioned the child, and ascertained that she had reached her hand out of the window, taken an anther from a tiger lily, and passed it into the right nostril. The child pointed out the lily, and the mother found just one anther missing. Mrs. B. was particular in her inquiries, and the child was positive in stating what she had done. Vomiting soon followed the discharge of mucus from

the nose. This consisted at first of chyme, having no appearance of undigested food, and was followed by vomiting of mucus, colored yellow, the same as the discharge from the nose. The child then wanted to go to sleep. The mother took her home, and then sent for me. I saw her at 6, P. M., Wednesday, August 13th, about one hour after the anther was passed into the nose. The child appeared sleepy, but was easily roused, and was intelligent. Vomiting of mucus tinged yellow occurred while I was present. The yellowness did not seem to be caused by bile. The symptoms did not seem at all alarming. Not aware that the tiger lily possessed any poisonous properties, I felt no anxiety, and went away, after prescribing remedies, requesting to be called if anything new occurred. I was sent for about 10 P. M., four hours afterwards. Evacuations of the bowels had occurred; at first of natural appearance, then followed discharges colored yellow, the same as the vomiting and the discharge from the nose, and at last bloody discharges. The vomiting had occurred occasionally, and this at last became bloody. The child was dull, sleepy and languid. I prescribed astringents, opiates in the form of paregoric, and brandy and water, if the languor should increase. I saw her Thursday morning. A dejection, quite bloody, occurred between 1 and 2 o'clock, A. M., and after that the dejections were checked. She was relieved of the vomiting. The child seemed languid, rather sleepy; no wandering. The eyes had a dull, reddish injection. At 4 P. M., same day, appearance of the child much the same as in the morning. The right nostril was nearly closed; membrane of both nostrils very pale. Some discharge of clear, thin mucus. Friday morning.—The child looked brighter. Same reddish injection of the eyes. No urine had been passed during the last twenty four hours. Slight feverish symptoms. No delirium. 7 P. M., Friday.—No urine had been passed. Several dejections, dark colored, very offensive. Some fever during the day, slight delirium and startings. Some nausea. Was called to her about 1 o'clock, Saturday morning. Shortly before, she had a large, dark colored, very offensive discharge, and immediately began to sink. She died a little before 4 o'clock, about fifty-nine hours after passing the anther into the nostril."

—*Bost. Med. and Surg. Journ.*, Nov. 6th, 1862.

THE FETID ODOR OF THE SKUNK.

(*Mephitis Americana* L., *M. mesomelas* Licht.)

Both sexes of this animal possess certain glandular sacs near the lower extremity of the intestinal canal, which secrete a yellow oil possessing that well known odor of the skunk. Lassaigne, who first examined the oil, states that it consists of a fatty and a volatile oil, the latter containing 8 p. c. of sulphur. Dr. Swartz (*Annalen der Chemie u. Pharmacie*, vol. cxxiii., p. 267) had procured a quantity of the oil and three of the small glands from New York, and examined the same in Woehler's laboratory.

The glands, of about the size of a walnut, were first distilled with water. A colorless oil passed over, having the unpleasant order of organic sulphides: it floated on cold, but sank in hot water, and when lighted burned with a blue flame evolving sulphurous acid. Various circumstances render it more than probable that it consists of at least two different volatile ingredients, the separation of which was impossible from the small quantity of material on hand. The oil contained 16 p. c. of sulphur.

The oil obtained from New York was of a dark yellow color, limpid, and of a very offensive odor, resembling that of compounds of allyle, but different from that of the oil distilled from the glands. Subjected to fractional distillation it gave between 221° and 230° F. a colorless liquid oil possessing a penetrating odor like mercaptan. The thermometer then rapidly rose to 374° to 392° F., when a thicker oil of a yellow color came over, the odor of which was nearer that of the oil from the sac. On distilling the residue afterwards with water an oil passed over which appeared to be identical with the oil distilled from the glands, so that it would almost appear as if the same had once been subjected to distillation. The thicker oil also contained a considerable proportion of sulphur.

The water which came over with the oil possessed a strong odor, and the property of precipitating the solutions of metals. On being left in contact for some time with hydrated oxyde of lead, the odor undergoes an essential change, sulphide of lead

being formed at the same time. The liquid filtered from the latter gives a white precipitate with mercuric chloride, which precipitate was decomposed by sulphuretted hydrogen, being decomposed into sulphide of mercury and the chloride of an alkaloid, crystallising in fine, very deliquescent prisms possessing a burning taste. The platinum salt is soluble in boiling water, and crystallises out on cooling; the same takes place with gold salt. The base itself is volatile, and is formed when the chloride is distilled with oxide of silver; the chloride itself is volatile also. The oil of the skunk appears to possess a decided action on the urinary organs. Dr. Swartz, while distilling the glands was taken with violent headache and dysuria; the urine passed with scalding and had the odor of musk, and it deposited a brown substance of the same odor. He also continued to transpire for several days the foetid odor of the oil.—*Druggists' Circular, December, 1862.*

AMYLOGEN.

Amylogen is a starch which has been rendered soluble without undergoing any chemical change, that is, it is starch in the state in which it fills the starch granules or cells. Flückiger (*Schweizer Zeitschrift für Pharmacie*, v. p. 185) prepares it not by the troublesome process of trituration with sand, as has been done by Jessen and Delffs, but simply by digestion in a solution of neutral chloride of calcium. One part by weight of the starch, (whether from potatoes, wheat, tapioca, arrow-root, or that from the rhizome of *Nephradium Filix mas*,) is macerated for two or three days in ten to twenty times its weight of solution of chloride of calcium, being frequently shaken during that time. It is then mixed with from 100 to 150 times the bulk of water, with which it forms a stiff jelly, from which either at once or by further dilution with water, a solution of amylogen (together with chloride of calcium) can be separated by filtration. It retains for more than two weeks the property of turning blue with iodine.

On adding alcohol to the solution, amylogen is precipitated in the form of white flakes, which after removing from the liquid,

the Mexicans *Nacahuite*, a name sufficiently like *Anacahuite* to justify a suspicion of identity. This suspicion has been changed into certainty. In a recent number of *Flora*, occurs the following interesting notice which is republished in *Bonplandia* of 1st November last.

In the summer of 1861, the Botanical Garden of Gottingen received from Mr. Gresser, the Hanoverian Consul at Tampico, two stems of the Anacahuite-tree, which although in a very unpromising condition upon arrival, yet by suitable treatment soon threw out new shoots. They have now grown into strong shrubs, and last winter produced flower buds, the full development of which was however prevented by the unfavorable season. Mr. Gresser at a subsequent period, sent also dried leaves of the Anacahuite, and the fruit preserved in alcohol, which with the growing specimens, afforded data for determining the plant to be the *Cordia Boissieri* of Alphonse De Candolle, described in the 9th volume of the *Prodromus*, p. 478.

In the herbarium of Sir William J. Hooker of Kew, there are good specimens of *Cordia Boissieri*, from which, with the permission of Sir William, the opposite wood-cut has been made. [The figure is omitted here.]

Touching the properties of the natural order *Cordiaceæ* to which *Cordia* belongs, the remarks of Endlicher* are to the following effect. The pulp of the drupes is mucilaginous, viscid and astringent, with some sweetness; in a few it is acidulous; the fleshy cotyledons contain a bland oil. The saccharine fruits of *Cordia Myxa* L. a tree indigenous to tropical Asia, and cultivated in Egypt from a very remote period, were used by the ancients in coughs and other disorders of the respiratory organs on account of their soothing and laxative properties. In Europe they are now very rarely employed. The West Indian *Cordia Sebestena* L., has similar virtues. Of some members of the order the wood and leaves are resinous and aromatic. The brown wood, elegantly veined with black, of *Cordia Rumphii* Bl., has the odor of musk. The bark of *Cordia Myxa* L., is frequently used in astringent gargles in India, and the root is reputed to be laxative.—*Lond. Pharm. Journ.*, December, 1862.

*Enchiridion, p. 319.

ON THE DECIMAL SYSTEM OF WEIGHTS AND MEASURES.

The Report of the Select Committee appointed to consider the practicability of adopting a simple and uniform system of weights and measures has just been published. The following recommendations are laid before the House, together with a great mass of evidence and tabular appendices: "1. That the use of the metric system be rendered legal. No compulsory measures should be resorted to until they are sanctioned by the general conviction of the public. 2. That a Department of Weights and Measures be established in connection with the Board of Trade. It would thus become subordinate to the Government, and responsible to Parliament. To it should be entrusted the conservation and verification of the standards, the superintendence of inspectors and the general duties incident to such a department. It should also take such measures as may, from time to time, promote the use and extend the knowledge of the metric system in the departments of Government and among the people. 3. The Government should sanction the use of the metric system (together with our present one) in the levying of the Customs' duties; thus familiarizing it among our merchants and manufacturers, and giving facilities to foreign traders in their dealings with this country. Its use, combined with that of our own system, in Government contracts has also been suggested. 4. The metric system should form one of the subjects of examination in the competitive examinations of the Civil Service. 5. The gramme should be used as a weight for foreign letters and books at the Post Office. 6. The Committee of Council on Education should require the metric system to be taught (as might easily be done by means of tables and diagrams) in all schools receiving grants of public money. 7. In the public statistics of the country quantities should be expressed in terms of the metric system in juxtaposition with those of our own, as suggested by the International Statistical Congress. 8. In private bills before Parliament the use of the metric system should be allowed. 9. The only weights and measures in use should be the metric and imperial, until the metric has been generally adopted. 10. The proviso in the 5th

and 6th William IV, cap. 63, clause 6, allowing the use of 'local and customary measures' in cases where the vessel employed 'is not represented as containing any amount of imperial measure or of any fixed local or customary measure heretofore in use,' should be repealed as giving facilities to evade the statute. 11. The department which it is proposed to appoint should make an annual report to Parliament."—*Chem. News*, Sept. 13th, 1862.

POROUS WATER-PROOF CLOTH.

This quality is given to cloth by simply passing it through a hot solution of weak glue and alum. To apply it to the cloth, make up a weak solution of glue, and while it is hot add a piece of alum, about an ounce to two quarts, and then brush it over the surface of the cloth while it is hot, and it is afterwards dried. Cloth in pieces may be run through this solution, and then run out of it and dried. By adding a few pieces of soap to the glue the cloth will feel much softer. Goods in pieces may be run through a tubfull of weak glue, soap and alum, and squeezed between rollers. This would be a cheap and expeditious mode of preparing them. Woollen goods are prepared by brushing them with the above mixture, first in the inside, then with the grain or nap of the cloth, after which it is dried. It is best to dry this first in the air and then in a stove-room at a low heat, but allow the cloth to remain for a considerable time to expel the moisture completely. This kind of cloth, while it is sufficiently water-proof to keep out moisture and rain, being quite impervious to water, is pervious to the air. Many fishermen know that, by boiling their pants, jackets, nets and sails in a pot with oak bark and fish skins, and afterwards drying them, they become water-proof. The composition mentioned above is of nearly the same nature as the fish glue and oak bark, and consequently the same effects are produced. The composition is stated to be improved by adding about one-fourth the quantity of the sulphate of copper to the alum. Cloth made water-proof in this manner will resist the effects of water, even if it is somewhat warm, but it loses its water-proof properties if boiled.—*Lond. Chem. News*, Oct. 11th, 1862.

Editorial Department.

WEIGHTS AND MEASURES OF THE BRITISH PHARMACOPŒIA.—After much delay there seems to be a fair prospect that the British Pharmacopœia will be published. The cause of the delay has been of a two-fold character. 1st, because of the inability of the "General Medical Council" to take out a copyright without a special act of Parliament; and 2d, because, when the report of the Pharmacopœia Committee came before the Council, it was resolved, that so much of the report as related to weights and measures should be reconsidered. When the Council entered on this labor they had presented to them communications from their Executive Committee, from the Colleges of Physicians of London and Edinburgh, the Pharmacopœia Sub-Committees of London, Edinburgh and Dublin, and the Council of the Pharmaceutical Society in Edinburgh.

The Executive Committee doubted the expediency of changing the old weights, and wanted the opinions of Sir John Herschel and Prof. Miller.

The London College of Physicians did not object to introducing the avoirdupois pound, but opposed the new grain of Dr. Wilson, and wished the troy grain retained.

The Edinburgh College of Physicians considered the old Apothecary's weight to be unsatisfactory, and the proposed change of the Pharmacopœia Committee to be an improvement, but approved of the Medical Council "at once taking the lead in inaugurating the decimal system, by introducing it into the new Pharmacopœia."

The London Sub-Committee abandons the new grain, opposes the metrical system, advises waiting, and not at this time making a change, as two out of the three Pharmacopœias now use troy weight; and lastly, they admit that the return to the troy weight will involve a very extensive revision of the manuscript of the British Pharmacopœia.

The Edinburgh Sub-Committee justify and uphold the weights as adopted in the original report, "as the only eligible mode of reconciling real existing discrepancies, and getting rid of actual serious inconvenience." At the same time they will hail with pleasure the introduction of the decimal system, when science, trade, and government can agree on its introduction.

The Dublin Sub-Committee fully agreed with that of Edinburgh. The Council of the Pharmaceutical Society in Edinburgh advocated the avoirdupois weight of the report.

With these views before them, the General Council considered the subject, and after negating a motion to introduce the French decimal weights, and also a motion to have only the Avoirdupois pound and the Troy grain and its multiples, they finally resolved

"That the weights used in the British Pharmacopœia be the Imperial or Avoirdupois pound, ounce, and grain, and that the terms 'drachm' and 'scruple' as designating specific weights be discontinued."

It follows, therefore, only one kind of weights will be used in medicine, in the British Empire, and that the United States Pharmacopœia will stand alone in employing the Troy or Apothecary's weight.

ON THE SALE OF LIQUORS BY APOTHECARIES.—It is a subject of much annoyance that the revenue law is not rendered clear and unequivocal in its expressions. One of the chief sources of revenue is proposed to be the sale of liquors. Liquors are regularly sold by a special class of retail and wholesale dealers—but whilst the dealers have the general trade in liquors, the Apothecary is compelled to keep, and is expected to furnish the sick with French brandy, port wine, and sherry, because these are *medicines* in the official list of the National Pharmacopœia, and as such are as much a subject of legitimate sale for medicinal use as castor oil, oil of turpentine, or honey. Section 66 enacts that nothing contained in the preceding sections shall be construed to require a license from Apothecaries "as to wines or spirituous liquors which they use exclusively in the preparation or making up of medicines for sick, lame, or diseased persons." Is it to be understood from this that an apothecary who pays the Government a license for selling drugs and medicines as an apothecary, must pay it another license for the sale of two or three items in the list because these are the subject of a special license to special retail and wholesale dealers? Now, by far the majority of apothecaries do not sell as much brandy and wine in a year as would pay for the license, and yet they are bound to keep and sell these articles by their duty to physicians and the public. In a recent case, a Government official denied the right of an apothecary to furnish brandy even on the prescription of a physician, unless it was mixed with some other medicine. It is quite time that this matter was cleared up, and the real right and duty of the apothecary ascertained, when he strictly confines his sale of these articles to legitimate medicinal use, and requires in all cases, except when on a physician's prescription, that the purchaser should certify to that fact. Our own opinion would favor the entire exclusion of liquors from the shop, were it not in the line of duty to keep them.

THE NEW YORK COLLEGE OF PHARMACY.—In the present number we have two valuable original contributions to our pages, from Professors Maisch

and Mayer, of the New York College of Pharmacy. With so able a faculty we cannot doubt the success of the New York School of Pharmacy, if the pharmacutists of that large city can be properly awakened to the importance of the instruction to be obtained at its lecture hall. It is the interest of every apothecary to see that his assistants and apprentices get such theoretical instruction as they are not likely to get in the shop, because it enables them to correct errors, and get over practical difficulties in prescription dispensing, or in making preparations.

We are aware that much apathy exists in the mass of New York Pharmacutists in regard to aiding their young men in obtaining this instruction, by granting the time it requires from the shop; and this is a difficulty also met with here; but it is gradually being overcome. For the sake of the good fruits it will produce in pharmaceutical progress, we would urge our New York friends to build up their school on a broad and solid foundation, by giving it present encouragement and aid.

Proceedings of the American Pharmaceutical Association, at the Tenth Annual Meeting, held in Philadelphia, September, 1862, with the Constitution and Roll of Members. Philadelphia. Merrihew & Thompson, Printers, 1862. pp. 357, 8vo.

This volume made its appearance about the usual time, and in general aspect, as regards size and execution, corresponds well with its predecessors. About fifty pages are occupied with the Minutes, one hundred and forty by Mr. Maisch's Report on the Progress of Pharmacy, about fifty pages with the other original communications, and the balance with the roll of members, Constitution, and Mr. Wiegand's general Index to the first eight volumes, which last occupies forty-two pages.

The prominent feature of the book is Prof. Maisch's Report on the Progress of Pharmacy, which exhibits a systematic arrangement and classification of subjects not hitherto adopted in these reports, and renders it very easy of consultation; and from its extensive scope, it will prove a very valuable storehouse of facts for investigators. After some generalities relative to schools and the literature of Pharmacy, the Report enters on a detailed though concise statement of the various papers that have appeared on Practical Pharmacy, Materia Medica, Medicinal Chemicals, Inorganic Chemistry, Organic Chemistry, General Analysis, and Organic Analysis. The author comments on the points of value of the papers in a manner calculated to greatly aid research. The general expression of favor which this report has received, both from the Association collectively, and from individual opinion, has, we think, done only justice to the laborious and discriminating industry of the author.

Of the other papers, those of Prof. Mayer, of New York, on testing for

Alkaloids, Geo. J. Scattergood on *Veratrum Viride*, and Wm. S. Merrill on the Alkaloids of *Hydrastis*, are most worthy of remark. The all-absorbing influence of the rebellion exhibits its power in the failure of so many contributions to the Proceedings.

The general Index of Mr. Wiegand will prove to be very useful for reference to the back volumes of the Proceedings. It is only to be regretted that as it is published with the tenth volume that it should not have embraced all the volumes instead of eight. It would have imposed additional labor on Mr. Wiegand, but that accomplished has been done so well that it only makes the regret the greater that his report does not embrace all to the present inclusive.

In concluding our notice, we would direct the attention of members of the Association to the excellent remarks of the editor—Edward Parrish—in the prefatory note, pointing out matters for their consideration with a view to the next meeting, and for the future usefulness of the Association. In quality of execution and correctness we believe the book to be fully up to the volumes that have preceded it.

The action of Medicines in the System; or on the mode in which therapeutic agents introduced into the stomach produce their peculiar effects on the animal economy, being a prize essay, &c. By Frederick William Headland, M. D., B. A., F. L. S., &c., &c. Fourth American Edition, Philadelphia. Lindsay & Blakiston. 1863. pp. 448. Octavo.

Dr. Headland's work has been so long before the American medical public that any recommendation of it in this place would be a work of supererogation. With a subject clouded with so much mystery as that of "Action of Medicines in the System," no author can be expected to give mathematical accuracy of demonstration, yet few writers on this subject have kept closer to the inductive path that leads to ultimate success, and shown more acuteness in observation, than has our author.

The price of the volume is two dollars, and may be had of the publishers, South Sixth Street.

The Physician's Pocket Memorandum for 1863. By C. H. Cleveland, M. D. Cincinnati, Ohio.

Dr. Cleveland's book is favorably known by numerous practitioners. In this *fourth edition* many previous typographical errors are corrected, and some alterations made for the better. The usefulness of this form of memorandum book we have before testified to, and need only direct the attention of our medical readers to the fact of its readiness.

The Dentists' Memorandum : A Book of Engagements and Manual of Ready Reference for 1863. By C. H. Cleveland, M. D. Cincinnati. Bradley & Webb, printers, 1863.

This little volume is gotten up in the same style as the author's Memorandum addressed to Physicians. About thirty pages of letter-press are embodied, consisting of succinct notices on prominent points connected with dentistry, recipes of various kinds, and information for cases of emergency. It presents many conveniences, and certainly will greatly aid the dentist in conducting his business with regularity.

OBITUARY.—CHARLES T. CARNEY, the accomplished pharmacist and able chemist, of Boston, has closed his earthly career. About the middle of 1862 we first heard of his indisposition, when, as Chairman of an important committee of our National Association he signified his physical inability to furnish the report. From that time his indisposition increased, and, by the advice of his friends, he sought the air of Minnesota, at St. Paul's; but his disease (phthisis) had closed in on him too effectually to be overcome, and he rapidly sank into his rest in September last. We cannot but recall a few words of his own in the last report he made as Chairman of the Executive Committee of the Association. Speaking of the annual record of deceased members, he remarks: "It calls forth feelings of sympathy with those more nearly related to the deceased, as well as sober views for ourselves and our own future. We cannot hope to pass a single year now, as an Association, without having some record of death's doings to make at each annual meeting. Our numbers are so large and widely scattered, that it would be indeed remarkable if we have no losses to record. Let the fact that this *must* be not make us less hopeful for the future, but strengthen us in every faithful discharge of duty, feeling that however and whenever the summons comes, those who have done faithfully and well need feel no fear."

At a meeting of the Trustees of the Massachusetts College of Pharmacy, held on the 1st of October, a committee was appointed to communicate to the widow of the deceased a proper sense of their appreciation of the loss she had sustained. The Committee say of him: "Standing, as he did, at the head of our profession, having qualified himself by a life of severe self-devotion to study and research, possessing extraordinary ability as an instructor, he has left a vacancy which cannot be filled. He was the centre of our circle, beloved and respected by all, and his worth will remain the richest treasure of our memory."

An occasional intercourse during ten years nearly, enables us to coincide in this strong testimony to the virtues and ability of our late associate.

Catalogue of the Class of the Philadelphia College of Pharmacy.

FOR THE FORTY-SECOND SESSION, 1862-63.

With a List of their Preceptors and Localities.

MATRICULANTS.	TOWN OR COUNTY.	STATE.	PRECEPTOR.
Addoms, F. E.	Honesdale,	Pennsylvania,	Charles Shivers.
Armstrong, Wm. E.	Philadelphia,	"	T. Morris Perot.
Bachman, Adolphus	"	"	Adam H. Wilson,
Berger, Christian	"	"	Charles Ellis & Co.
Bird, B. L.		Maryland,	
Buss, Oliver	Philadelphia,	Pennsylvania,	C. H. Eggert,
Campbell, Hugh	"	"	J. Duntun.
Coggins, Franklin	"	"	Bullock & Crenshaw.
Cole, John W.	"	"	R. P. Thomas, M. D.
Combs, Matthew	"	"	Matthew Combs.
Cunningham, Jn. M.	"	"	Caleb R. Keeney.
Dilworth, J. B., M. D.	"	"	
Eldridge, Geo., W.	Haddonfield,	New Jersey,	H. N. Rittenhouse.
Evans, Joseph F.	Philadelphia,	Pennsylvania,	John Goodyear.
Evans, J. Estell	Woodbury,	New Jersey,	French & Richards.
Field, Byron G.		"	Wyeth and Bro.
Fox, Daniel S.	Reading,	Pennsylvania,	H. A. Bower.
Givens, M.	Philadelphia,	"	Wm. M. Reilly, M. D.
Gold, Hiram	Easton,	"	John De Lacy, M. D.
Haines, Nathan	Burlington,	New Jersey,	Wm. J. Allinson.
Halpin, Wm. J.	Philadelphia.	Pennsylvania,	Geo. D. Wetherill & Co
Hambright, George M.	Lancaster,	"	Jos. C. Turnpenny & Co.
Hamer Henry C.	Philadelphia.	"	Jenks & Middleton
Harry, J. W.	Conshohocken,	"	D. W. Harry.
Hillary, John F.	Philadelphia,	"	Wm. Hillary.
Hoffmann, C. Ferdinand		Germany,	Bullock & Crenshaw.
Huber, Milton	Norristown,	Pennsylvania,	Wm. Stahler.
Jeannot, Geo. Edward	Locle,	Switzerland,	J. R. Anguey, M. D.
Jones, Edward C.	Philadelphia,	Pennsylvania,	A. H. Yarnall.
Jones, Samuel T.	Bordentown,	New Jersey,	Daniel S. Jones.
Kenworthy, James	Philadelphia,	Pennsylvania,	James T. Shinn.
Kirkbride, Joseph C.	Camden,	New Jersey,	J. C. Delacour.

Lachenour, H. D., M. D.	Easton,	Pennsylvania,	
Laciar, Joseph	Bethlehem,	"	Philip H. Horn.
Lehlbach, P. Frederick	Newark,	New Jersey,	Wm. Wider.
Lineaweaver, K. C.		Pennsylvania,	Wm. Hodgson, Jr.
McCormick, Wm.	Philadelphia,	"	Amos Hansall.
McElroy, A. C.		New Jersey,	Charles Ellis & Co.
McIntyre, Wm.	Philadelphia,	Pennsylvania,	John Bley.
Mellor, Alfred	"	"	Bullock & Crenshaw,
Milke, Wm.	"	"	E. Herwig.
Milner, James P.	"	"	W. H. Naulty.
Moore, Joseph E.	"	"	James L. Bispham,
Morand, Henry M. F.		France,	Daniel Hersbey, M. D.
Morell, Elijah S.	Philadelphia,	Pennsylvania,	U. S. Hosp. W. Philad.
Morris, Henry B.	"	"	Jenks & Middleton.
Moser, Americus H.	Allentown,	"	E. B. Garrigues.
Mullen, Albert H.	Philadelphia,	"	Charles Ellis & Co.
Murray, T. C.	"	"	Isaac H. Kay.
Notson, George W.	Philadelphia,	"	Wm. Notson, M. D.
Pile, Gustavus	"	"	Wilson H. Pile, M. D.
Powell, Wm. M.	"	"	James L. Bispham.
Rice, Wm. C. Jr.	"	"	Jenks & Middleton.
Rohrer, Earl Penn	"	"	Thomas Estlack.
Ruan, James	"	"	Geo. M. Snowdon.
Rubincam, Charles E.	Bucks Co.,	"	Jenks & Middleton.
Sailer, Randolph	Philadelphia,	"	Powers & Weightman.
Schultheis, Christian	Quincy,	Illinois,	Wm. Metz.
Segner, William	Palmyra,	Pennsylvania,	J. P. Fittler.
Shallcross, Aaron P.		Ohio,	E. Parrish.
Shivers, Charles, Jr.	Philadelphia.	Pennsylvania,	Charles Shivers.
Simes, John H. C.	"	"	John W. Simes & Son.
Simpson, Robert	"	"	L. M. Emanuel.
Smith, Edwin R.	Chicago,	Illinois,	E. H. Sargeant.
Stokes, Isaac		New Jersey,	Charles Ellis & Co.
Taitte, Stewart	Philadelphia,	Pennsylvania,	Roger Keys, M. D.
Thomas, Chester S.	"	"	Hughes & Coombe.
Thomas, Jason P.	Tamaqua,	"	H. C. Blair.
Tilge, F. A.	Philadelphia,	"	Frederick Brown.
Tomlinson, Edwin	Haddonfield,	New Jersey,	H. C. Blair.
Weber, Henry J.	Pottsville,	Pennsylvania,	Hassard & Co.
Weber, Wm. A.	Philadelphia,	"	J. Weber, M. D.
Wilson, G. Banks	"	"	Charles Eberle.
Wilson, Walter H.	"	"	Alfred Tatem.

THE
AMERICAN JOURNAL OF PHARMACY.

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MARCH, 1863.  
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NOTE ON THE PROXIMATE PRINCIPLES OF SOME
BERBERIDACEÆ AND RANUNCULACEÆ.

BY FERDINAND F. MAYER.

Since the discovery of the yellow alkaloid Berberina in a new family, the fourth (Berberidaceæ, Menispermaceæ Anonaceæ, and Ranunculaceæ) and most extensive, it was to be presumed that other genera of these natural orders, especially those distinguished by rhizomes of a yellow color, would prove to owe the same to the presence of that alkaloid. In fact, some time after I began the examination, of which this is intended as a preliminary notice, I ascertained that my friend and colleague, J. M. Maisch, had intimated as much in regard to *Coptis trifolia*,* and that the Editor of this Journal had satisfied himself likewise on the same point; so that I can only confirm a prior statement.

There is present besides in the rhizome of the goldthread a colorless alkaloid, which, like Durand's hydrastia, is not precipitated by hydrochloric or nitric acids, and is separated in the same manner. For this as well as for several other colorless alkaloids, occurring in company with Berberina or otherwise in the families named, we must refrain from establishing new names until their relation to the other colorless alkaloids of the

*Buchner's Neues Repertorium f. Pharmacie, Band xi. July, 1862.

same families (Oxyacanthia, Pelosina, Menispermia) and to Hydrastia, has been defined.

From the late Jonathan Pereira's description of the root of *Coptis teeta** there remains little doubt but that the plants of this genus have a similar composition.

In *Berberis vulgaris* the yellow alkaloid was discovered by Brandes in 1825, but neither he nor Buchner and Herberger,† who gave the first analysis of the plant, noticed its true character. This was established by Buchner, Sr. and Jr.,‡ and afterwards by Fleitmann.§

Curiously enough, the same volume (iii.) of the Journal of the Philadelphia College of Pharmacy, in which is noticed the essay of Buchner and Herberger, and also the discovery of columbine in the root of *Cocculus palmatus* (Nat. Order Menispermaceæ), by Wittstock, contains a paper on an American Berberidacea, the *Podophyllum peltatum*, in which a bitter principle is described, which from the few data given by the author, Mr. William Hodgson, Jr., could only have been the yellow alkaloid of that family.

This substance, which received the name of *podophylline*, was obtained by the same process by which berberina is still extracted from the vegetables containing it, *i. e.*, by decoction in water and purification of the extract with alcohol. It was not freed from adhering brown resin, nor was its character as alkaloid noticed; but its bitterness, its solubility in cold water and precipitation by hydrochloric acid, were mentioned by Mr. Hodgson.

The rhizome of the May-apple contains both berberina and a colorless alkaloid, a resin, a free acid, a neutral odorous substance volatilizable in white scales, and *saponin*.

When the alcoholic extract of the rhizome is freed from alcohol and then mixed with water, the latter dissolves the acid, a

*Pharm. Journ. Trans. xi. 294.

Mishmee teeta, Mahmira, probably the same as mentioned by Paulus Aegineta, Actuarius, Avicenna, Rhazes, Ibn Baitar: *Chynlen* (Guibourt, *Histoire Naturelle des Drogues simples*.)

†Buchner's Repert. xxxvi. p. 1 (1830).—Journ. Phila. Coll. iii. p. 173.

‡Buchner's Repert. lii. p. 1, xciv. 176. Ann. Chem. Pharm. xxiv. p. 228.

§Ann. Chem. Pharm. lix. p. 160.

considerable quantity of berberina, and saponin, together with some resinous matter. The precipitate left after washing with water, the so-called resinoid *podophyllin*, is a mixture of a resin and the volatile principle, which are soluble in ether, and a portion soluble in alcohol, which is the other alkaloid in combination with saponin and brown resinous matter.

The wash-water or supernatant liquid from the precipitation of the impure resinoid contains berberina and saponin, besides free acid. The alkaloid can be precipitated by lead or by acids. When the liquid is reduced to the consistence of a thin syrup, and on cooling mixed with water, impure saponin is precipitated in considerable quantity.

The rhizome of another plant belonging to this family and used in Eclectic practice, *Jeffersonia diphylla*, twin-leaf, contains a small quantity of berberina, a larger proportion of a white alkaloid, and a considerable amount of saponin. The presence of alkaloids in this plant is indicated by the reactions obtained by Mr. Bentley,* in the aqueous decoction with iodine, tannic acid and corrosive sublimate.

Mr. E. S. Wayne, who has examined this plant,† mentions a bitter principle and an acrid acid. The pectin found by him is saponin. It forms a still larger proportion of the soluble constituents of the rhizome of *Leontice* or *Caulophyllum thalictroides*, Blue Cohosh.

The alcoholic tincture of this rhizome left to spontaneous evaporation, deposits a white granular substance in considerable quantity. No berberina is present, only a yellow coloring matter. The deposit washed with dilute acid, which dissolves a colorless alkaloid and soluble extractive, and then with some water, remains as a grayish white powder, which, for the greater part, consists of *saponin*; and this, together with a portion of the alkaloid, constitutes the so-called *caulophyllin* of Eclectic pharmacy.

These are not the first plants of the order of Berberidaceæ, in which saponin has been found. The *Leontice leontopetalon*, Linn., known to be used in the Orient for washing, etc., is men-

*Pharm. Journal and Trans. (2) iv. p. 106.

†Am. J. Pharmacy, vol. xxvii. p. 1.

tioned by Th. Martius,* among the plants containing that principle.

Its presence in these American plants will account for some of the acrid properties ascribed to their preparations.

[I have been favored by Dr. C. H. Cleaveland, of Cincinnati, with a very handsome collection of active preparations used by the Eclectic school, and I have availed myself quite extensively of the Doctor's information in regard to them. I have also to acknowledge the receipt of a fine set of duplicates of the alkaloids, which the giver, Mr. W. S. Merrell, of Cincinnati, had on exhibition at the meeting of the American Pharmaceutical Association in August last. As to the question of priority of discovery, which Mr. M. claims for the two alkaloids of *Hydrastis Canadensis*, I must leave that undecided, but cannot adopt the name by which he designates the yellow alkaloid. *Xanthin* or *Xanthia* would be quite appropriate when applied to a yellow colored principle; but for that very reason it has been a tempting title to others before. First, Liebig and Woehler applied it to the yellow base discovered by Marcet in 1819 in certain concretions of the bladder, and since found by Strecker and Scheerer to be a normal constituent of the animal body. Then, Unger used it for some time for the base of guano; next the name was applied by Higgins to the yellowish glucoside of madder, the same which Schunck calls *rubian*, and which in all probability is impure ruberythric acid. Lastly, Fremy and Cloez, in their essay on the coloring matters of flowers, have distinguished a yellow principle insoluble in water, which they style *Xanthin*, and a soluble one, *Xantheïn*. There is really no cogent reason for any change in the name of the yellow alkaloid of the Berberidaceæ and cognate families, none half as good as there would be in substituting benzidam for anilin.]

New York, February, 1863.

CLEMENS' SOLUTION OF BROMO-ARSENATE OF POTASSA.

This solution is made (*Druggists' Circular*) as follows:—

Take of Glacial Arsenious Acid in powder,

Carbonate of Potassa, of each a drachm,

Dissolve them in half a pint of water by heat, dilute the solution to 12 fluidounces, in a stoppered bottle, add two drachms of Bromine and digest at a gentle heat till a colorless solution is obtained.

Dose: 3 or 4 drops once or twice a day.

*Euchner's Neues Repert. vol. xi., August and Sept., 1862.

CHEMICAL EXAMINATION OF COMMERCIAL CHLORIDE
OF PROPYLAMINA.

BY WM. T. WENZELL.

On examination of a specimen of Chloride of Propylamina made by one of our best manufacturing chemists, by the microscope, it was found to consist of well crystallized arborescent hexagonal prisms. On mixing its aqueous solution with one of bichloride of platinum in excess, it gave, after half an hour's repose, the yellow octohedral crystals of $\text{NH}_4\text{Cl} + \text{PtCl}_2$. The filtrate from the ammonia salt was evaporated to dryness, adding more bichloride of platinum, so as to keep it in excess. During the evaporation, which was conducted on a water bath, quite a quantity of a yellow crystalline precipitate subsided. The dried mass was treated with etherized alcohol, thrown on a filter and washed. The washed platina salt was carefully dried at a temperature of 180° Fahr., transferred to a small porcelain crucible and weighed. The nett weight found was 3.37 grains. After ignition it gave 1.24 grs. platinum. Chloride of Propylamina ($\text{NH}_3(\text{C}_6\text{H}_5)\text{Cl} + \text{PtCl}_2$) should give 37.08 of platinum; the amount here found is 36.79, which is sufficiently near to identify the Propylamina. The filtrate obtained after the separation of the propylamina salt was necessarily allowed to stand over night, and found much darkened from reduced platinum. It was, therefore, evaporated to dryness, dissolved in water filtered to separate the reduced metal, again evaporated, and finally dissolved 60 per cent. alcohol; the residue not being altogether soluble in 95 per cent. alcohol. The filtrate on spontaneous evaporation was found to deposit transparent, colorless slender prisms insoluble in absolute alcohol and ether. The crystals on ignition left metallic platinum, thereby showing the existence of a double salt of an amine base and platinum. Want of time has forced me to lay this subject aside for future investigation. The percentage of hydrochlorate of ammonia contained in the chloride of propylamina under examination, I have quantitatively estimated at .027 per cent. by means of phosphate of soda and sulphate of magnesia.

HISTORY OF THE ORGANIC RADICALS.

BY M. AUGUSTE CAHOURS.

A Lecture delivered before the Chemical Society of Paris, March 30th, 1862.

Translated from the French, by W. S. W. RUSCHENBERGER, M. D., U. S. N.

(Continued from page 12.)

Some chemists, with Ampere, admit into these compounds the existence of the radical



designated under the name of ammonium, $[\text{NH}^4]$ a radical which has not yet been isolated notwithstanding all the efforts which have been made, and, it would be at a risk of being illogical, to admit its formation by contact of chlorohydric acid with ammonia, the tendency of the latter to unite with hydrogen being so feeble as not to be sufficient to overcome the powerful affinity of chlorine for this gas. We know that when we cause the amalgam of potassium to act on a concentrated solution of an ammoniacal salt, with the view of obtaining the amalgam in which is admitted the existence of the compound



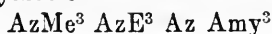
this is spontaneously destroyed, although its union with mercury tends to give it stability. It cannot be supposed more reasonably, that the affinity of chlorine for the compound, which tends to be produced, may be susceptible of determining its formation; for it is enough to cause chlorine to act on a solution of chlorohydrate of ammonia, by aid of a gentle heat, to see the compound resolve itself entirely into azote [nitrogen], which is disengaged in a gaseous form, and chlorohydric acid which remains dissolved. Is it then not more simple and more logical to admit that the union of two bodies placed in contact, begets a particular group which is referred to the type



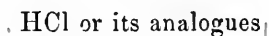
which appears to be the term of saturation of the compounds which azote [nitrogen] is susceptible of forming?

The same is true in regard to the derivatives from ammonia known under the name of trimethyliac, triethyliac, triamylac, &c., which are formed, as we know, by the substitution of three molecules of methyl, ethyl, or amyl, for the three molecules of

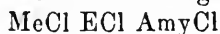
hydrogen which it contains; these compounds which may be represented by the symbols



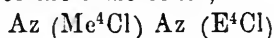
may fix either



or



to form compounds of the same order,



in which we must admit, without more serious reasons, the existence of new radicals derived from ammonium, radicals which it has been as impossible up to this time to isolate as ammonium itself. There is certainly nothing improbable in supposing that we may obtain a compound formed of one equivalent of azote and four equivalents of hydrogen, but the mind refuses to admit that a like compound can arise from the contact of chlorohydric, bromohydric acids, &c., while we know the considerable affinity which the constituent principles of these gases have for each other, and the enormous resistance they offer to decomposition. Is it not much more simple to admit that azote as well as its congeners is susceptible of forming divers combinations of which the term of saturation is of the form



As long as this limit is not obtained, we may add to the product under consideration, one or more equivalents of the same substance or of different substances, until we have reached it. The inferior term which is considered to play the part of fixing certain bodies to form definite compounds, could it be separated intact from these compounds by the intervention of reagents or forces purely physical, would present the properties which characterize simple bodies.

There is certainly between the ammoniacal compounds and those which the alkaline metals form, analogies well worthy of serious study; but it must, however, be confessed, they are found more in the form than in the substance, which does not constitute a sufficient reason for assimilating them with each other.

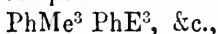
Proceeding from azote towards arsenic we observe in corresponding compounds quite curious differences, on which I desire in a few words to fix your attention.

Ammonia, in exchanging all its hydrogen for the groups methyl, ethyl, propyl, amyl, &c., gives rise to the compounds



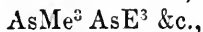
which may slightly enter into the formula which constitutes the term of saturation by the fixation of a molecule of chlorohydric, bromohydric acid, &c., after the manner of ammonia, but which are incapable of uniting with two molecules of oxygen, of chlorine, or of sulphur, to form analogous compounds, which shows that these products are wanting in the characters of radicals.

The corresponding compounds



like the preceding, have the property of uniting with acids, and also of fixing $\text{O}^2\text{Cl}^2\text{S}^2$, in the manner of simple bodies.

Their analogues of the arsenic series,



incapable of uniting with acids, fix with the greatest facility $\text{O}^2\text{Cl}^2\text{S}^2$, &c. So that phosphorus serves in some way as the transition between the compounds of nitrogen and the corresponding products formed by arsenic.

We have seen above, that among simple bodies there is a certain number which are susceptible of forming with methyl, ethyl, &c., compounds corresponding to oxides, chlorides, &c., in which oxygen or chlorine would be replaced by equivalent quantities of preceding groups. The numerous researches undertaken by M. Frankland with the view of isolating the alcoholic radicals have made us acquainted with two very remarkable compounds—the methyluret and ethyluret of zinc, belonging to the group



which have become a source of reactions full of interest. The most recent labors of M. Vanklyn in like manner have taught us that the alkaline metals may form analogous compounds; only these latter are so unstable, that, up to the present time, we have been unable to separate them from the compound which they form with the methyluret or ethyluret of zinc.

Left in contact with oxygen, these products absorb this gas with great avidity. The latter, far from uniting with the ternary group, brings complete destruction to the molecule by burning the elements which compose it; hence the inflammation

of the substance. In presence of water these liquids induce its immediate decomposition, producing metallic oxides, and hydride of methyl or of ethyl, a result easy to understand if we reflect that these different products represent compounds at saturation, containing elements endowed with energetic affinities for the constituent principles of this liquid, and consequently very apt to cause its destruction in decomposing themselves. The ethyluret of zinc, no more than the alkaline ethylurets, can act as a simple body, since it represents the most stable group which these metals are capable of forming, and consequently the name of *organo-metallic* radicals, by which they have been designated, is entirely inexact.

When we replace the zinc by the metals of diverse sections, we obtain in some cases entirely analogous reactions.

Under certain circumstances free ethylurets are formed, as in the case of magnesium; in others, and especially with tin, we obtain perfectly definite iodides.

A close examination of these interesting products, the study of their metamorphoses, and the circumstances of their production, have led me to consider all those which act in the manner of simple bodies, as not having attained the limit of saturation. This I propose to demonstrate to you now, abandoning the domain of hypotheses to enter into that of facts.

Magnesium, like zinc, which it resembles in so many respects, appearing susceptible of forming but a single group of the form

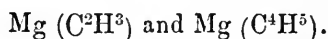


should evidently form by its union with methyl and ethyl only one combination. Experiment fully realized my expectations.

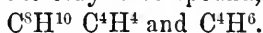
When filings of magnesium are placed in contact with the iodides of ethyl or methyl, a quite vivid reaction is manifested, and the mixture becomes strongly heated. If, after having mastered it by affusions of cold water, we introduce it into tubes sealed by a lamp, then maintain it during several hours between 120° and 130° [centigrade], we finally obtain a white mass which is resolved by distillation into several products. In effecting this operation in an atmosphere of hydrogen, we collect in the recipient a mixture of iodide of ethyl or of methyl, and a very volatile liquid possessing an aliaceous odor, which takes

fire in the air, and with violence decomposes water upon which it may be projected; the residue consists of iodide of magnesium. A new rectification made on the raw product permits the separation of the inflammable liquid from the iodides of methyl or of ethyl unaltered.

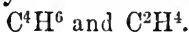
Analysis of these products, their manner of acting in respect to free oxygen and water, their manifest analogies to the zinc methyl and the zinc ethyl, leads us to represent them by the formulæ



In the reciprocal action of magnesium and the iodides of ethyl and of methyl, there is produced an abundance of gases which, in the case of the ethylic compound, consist of



With the iodide of methyl we obtain the products



The action of magnesium upon the iodides of ethyl and of methyl is entirely comparable to that which zinc exercises upon these compounds.

The ethylurets and methylurets which arise in this contact, correspond to the group



the only stable one which magnesium can form. We conceive therefore that these compounds, like the ethylurets and methylurets of zinc, are incapable of forming new combinations by assimilating one or several molecules of certain simple bodies, the latter being able only to induce the destruction of these compounds, to give rise to new groups which possess a more stable equilibrium.

Aluminium while cold exerts no action upon the iodide of ethyl; at 100° [centigrade], the attack is very manifest; in maintaining the mixture during twenty-four hours at 130° in hermetically sealed tubes, the reaction is complete. If the ethylic iodide be used in slight excess, the metal entirely disappears, and we find in the tubes a thick, brownish liquid, which gives off to the air abundant fumes. In distilling the contents of the tubes in an apparatus filled with hydrogen, we collect in the recipient a light amber-colored liquid, the disagreeable and penetrating odor of which recalls that of altered turpentine.

This liquid fumes strongly in the air, and inflames when projected into an atmosphere of oxygen or chlorine, disengaging violet vapors. It decomposes water in a sudden manner with a true explosion, producing alumina and iodohydric acid; it disengages at the same time an inflammable gas which burns with a pale blue flame.

This compound, which boils at about 350° , contains both aluminium and iodine, as well as carbon and hydrogen, in the proportions which constitute ethyl.

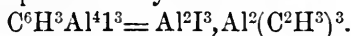
Numerous analyses of this product, and the decomposition which it undergoes with water, lead to the following formula:



which would make of it a compound of one equivalent of the iodide of aluminium with the corresponding ethyluret.

The zinc ethyl attacks it briskly, producing a very inflammable volatile liquid, which appears to be aluminethyl.

The iodide of methyl behaves towards aluminium in the same manner as the iodide of ethyl. As in the preceding case, we obtain a volatile liquid at a high temperature, burning in the air, and decomposing water suddenly, giving rise to hydruret of methyl (gas of marshes). The composition of this product, which contains at once aluminium, iodine and the elements of methyl, may be represented by the formula



Glucinium strongly attacks iodide of ethyl when heated with this liquid in hermetically sealed tubes. We then obtain, as with magnesium, a solid product, which distillation separates into iodide of glucinium, and an odorous volatile liquid possessing the property of decomposing water suddenly after the manner of the preceding substances, disengaging an inflammable gas. The behaviour of this liquid towards water seems to indicate that it is of a nature analogous to that of the compounds furnished by magnesium and aluminium. The very small quantity of glucinium at my disposal did not permit me to establish its constitution by analysis.

Iron attacks iodide of ethyl briskly, at about 175° to 180° [centigrade]; gases are produced abundantly, and we obtain an iodide of iron, but I have not been able to obtain in this reaction any definite ethyl compound.

Chrome even at 200° does not appear to react in any manner upon iodide of ethyl. It is the same with molybdenum and titanium.

Metallic tin in the form of leaves is rapidly attacked by iodohydric ether, when we maintain these bodies enclosed in hermetically sealed tubes during several hours at a temperature of from 140° to 150° . The reaction is effected even in a bath of boiling water, but in this case a much longer time is required. It is also effected at an ordinary temperature, as was ascertained by M. Frankland, by the intervention of solar radiation.

If care is taken to employ from two to two and a half parts by weight of the iodide of ethyl for one part of tin, the metal disappears entirely, and if the substances are pure and very dry, the tubes contain a solid white mass formed of long intercrossed needles which are soiled by a small quantity of yellow or brownish oil which colors them. When we break the point of the tubes, most commonly there is no trace of gas disengaged. The crystals are easily purified by drying, compressing them between folds of bibulous paper, dissolving them in alcohol and abandoning the liquor to spontaneous evaporation. Finally, we obtain after one or two crystallizations fine colorless prisms, having considerable lustre and entirely free from odor. The oil which soils the crystals, whose pungent, insupportable odor recalls that of horseradish and mustard, is a mixture of the iodide of ethyl which has taken no part in the reaction with the iodide of a ternary compound containing carbon, hydrogen and tin. Under some circumstances we find in the tubes also a small quantity of a red crystalline powder which is iodide of tin.

The prismatic crystals brought to a state of purity, melt at 42° into a very limpid colorless liquid, which usually boils between 245° and 246° , and distils without alteration.

Alcohol dissolves them in large proportion, particularly when hot.

Ether readily dissolves them even when cold.

Little soluble in cold water, they are dissolved in notable proportion when at the boiling temperature.

Rectified wood spirit dissolves them like alcohol.

An alcoholic solution of these crystals is immediately decomposed by sulphate, nitrate, acetate, and butyrate of silver, form-

ing insoluble iodide of silver and corresponding salts which crystallize readily by the evaporation of alcoholic distillation.

Analysis of these crystals leads to the formula

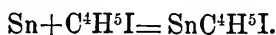


The behaviour of this product with reagents leads us to regard it as an iodide of a ternary compound formed of one molecule of tin and a molecule of ethyl, or as corresponding with the group



which represents the limit of saturation of the compounds of tin.

Their very simple formation is explained by means of the equation

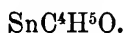


In considering the group

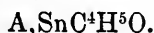


as a radical, the preceding compound would become an iodide entirely comparable to metallic iodides, the radical moreover being susceptible of separation from the combination by the intervention of metals more electro-positive than tin.

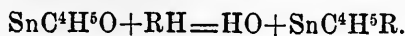
The caustic alkalis, potassa, soda, ammonia, cause in a solution of the preceding compound a white, flocculent, amorphous precipitate, insoluble in an excess of these reagents. This product, which does not differ from the preceding, except that the molecule of iodine is replaced by a molecule of oxygen, would be an oxide of this radical, which we will designate under the name of *stannethyl*; henceforward we shall represent its composition by the formula



This compound unites directly with acids, saturates the most energetic, and forms salts which, whenever they are soluble, crystallize with the greatest ease. Their composition is expressed by the general formula



The hydracids behave with it as with metallic oxides, the hydrogen seizing upon its oxygen to form water, while the radical of the hydracid goes to the stannethyl group to form a definite compound,



(To be continued.)

PHARMACEUTICAL NOTICES.

BY WILLIAM PROCTER, JR.

The following remarks are offered to the reader as mere laboratory notes, which may aid him in reference to some of the preparations to which they allude.

Ferri Sesquichloridum.—It has become usual for physicians to prescribe the solid perchloride of iron in solution, or in a syrup which is most easily prepared from the solid salt if it is entirely soluble. In order to possess this quality of solubility, and at the same time to be not too deliquescent; the chloride must be the crystallized hydrate with twelve equivalents of water, which has been adopted into the Pharmacopœia of 1860. The process which was found most eligible is to make a protochloride, and convert it into sesquichloride with nitric acid, as recommended by Wittstein and others. The chief difficulty in the process is in determining the point at which the evaporation should be stopped, which is best done by taring the capsule and stopping when the solution weighs $4\frac{1}{4}$ times that of the iron dissolved. The following is a sketch of the recipe:

Take of Iron wire (card teeth), three ounces, *troy*.

Muriatic acid (sp. gr. 1.16), eighteen ounces, *troy*.

Nitric acid (sp. gr. 1.42), a sufficient quantity, or about three troy ounces and a half.

Add the iron to twelve ounces of the acid in a quart flask, and apply a moderate heat until the acid is saturated and effervescence ceases. Filter the solution, mix with it the remainder of the muriatic acid; and having heated the mixture nearly to the boiling point, add the nitric acid in successive portions until red fumes cease to be evolved, and a drop of the liquid in a test glass affords no blue coloration, or precipitate with solution of red prussiate of potassa. Transfer the liquid to a smaller tared capsule, heated by a water bath, and evaporate it with frequent stirring until the weight of the solution is about twelve ounces and a half troy. Then set the capsule to cool, cover it with a bell-glass and leave it for two or three days, until the whole becomes a solid crystalline mass. The chloride should be then broken up and preserved in closely stopped vials.

Liquor Ferri Nitratis.—It will be remembered that the original formula for this solution by Kerr, produced a dark colored liquid, and very prone to deposit sesquioxide of iron. On two previous occasions the writer made suggestions to remedy this physical inconvenience, rendering the preparation a solution of the ternitrate, and in that form it is now in the Pharmacopœia, yet in two instances he has been told by physicians that they do not get the therapeutic effects from the new solution that appertained to the original. In reflecting on this statement, it has occurred to me, that the relationship between these two preparations is analogous to that between Monsel's solution and the solution of tersulphate of iron. Now it is well known that whilst the latter is sharply acid and almost caustic to the taste, and on an abraded surface, the former is mainly astringent, and may be applied to cut surfaces without much inconvenience. May not the old solution of nitrate of iron, owing to the greater proportion of oxide of iron present in it, and its weaker acid properties, possess more astringency and be more effective in chronic diarrhœa, etc., than the solution of ternitrate? The idea is thrown out to physicians that they may, by trial, decide the question of merit between them, if so disposed.

Extractum Rosæ Fluidum.—This preparation will be found a convenience for preparing the honey of roses as recommended by Graham, as well as for the syrup of roses, and for the compound infusion, both of which can be made from it extemporaneously.

Take of Red rose leaves, sixteen ounces, troy.

Diluted alcohol, (deodorized) a sufficient quantity.

Carefully dry the roses, pulverize and pass them through a sieve No. 60, moisten the powder with six fluidounces of diluted alcohol, pack it firmly in a funnel, cover it with a piece of muslin and pour on diluted alcohol until twelve fluidounces pass. Set this aside, and continue the percolation until a pint and a half more of liquid is obtained. Evaporate the latter at 120° F., in a porcelain dish, to four fluid ounces, and mix it with the reserved fluid. To make the honey of roses, add two fluidounces to eighteen fluidounces of good thick clarified honey. To make the syrup, add a fluidounce of the fluid extract, to fifteen fluid-

ounces of simple syrup, and mix them. To make the Compound Infusion of Roses, add two fluid drachms of the fluid extract to a pint of water, previously mixed with a fluid drachm of diluted sulphuric acid.

Extractum Cocculi Fluidum.—Being called upon to prepare a fluid extract of cocculus indicus, with a view to its use for the destruction of personal vermin, the following formula was adopted :

Take of Cocculus Indicus, sixteen ounces, troy.

Alcohol and water, of each a sufficient quantity.

Bruise and sift the cocculus, using a number 40 seive, until the kernels have passed the seive and the capsules have been well broken up. Moisten the powder with six ounces of a mixture of two parts of alcohol and one of water, and after standing two hours pack it in a conical percolator, and pour on the same menstruum, until twelve fluid ounces have passed. Digest the capsules in two pints of diluted alcohol for several hours at 130°, and after cooling, pour the whole into the percolator on the kernels. When the liquid disappears, pour on diluted alcohol, until two pints more of percolate is obtained. Evaporate this to four fluid ounces, mix it with the reserved tincture, and after standing twenty-four hours filter through paper.

Extractum Leptandræ Fluidum.—Several years ago, Mr. S. Campbell published a formula for this preparation, (vol. vi. 3d series, 225) of the strength of half an ounce to the fluidounce, in which carbonate of potassa was introduced with the view of dissolving the resinoid constituents which it was presumed could not be held in solution in the ordinary manner, although the menstruum was strongly alcoholic. After some study of this preparation, it is proposed to make this fluid extract of the full strength, and to omit the carbonate of potassa, mixing a portion of sugar, and retaining part of the alcohol. The formula in the Eclectic Dispensatory (page 1096, edit. 1859,) yields a good fluid extract, but involves too much evaporation and requires three distinct operations.

Take of Leptandra root, in powder, (No. 60 seive,) sixteen ounces, troy.

Sugar, four ounces.

Alcohol and water, of each a sufficient quantity.

Mix a pint of alcohol with half a pint of water, and moisten the powder with three fluidounces of the mixture, pack it in a glass percolator and pour on the remainder of the menstruum. Continue the percolation with diluted alcohol until a pint of tincture has passed. Set this aside in a warm place, that it may be reduced to half a pint by evaporation, and continue the process until three pints more of tincture have slowly passed. Evaporate this on a water bath, to a pint add the sugar, and again evaporate till reduced to half a pint, and whilst yet hot mix it with the reserved evaporated tincture, so as to get a pint of fluid extract.

The direction towards the liver attributed to *Leptandra*, has caused it to gain considerable reputation as a cholagogue, and no preparation of it is more efficient than the fluid extract when well made.

Extractum Cascarillæ Fluidum.

Take of Cascarilla, in fine powder, (No. 60 seive,) sixteen ounces.

Alcohol and water, of each a sufficient quantity.

Mix twelve fluidounces of alcohol with four fluidounces of water, and moisten the powder with six fluidounces of the mixture, pack it in a glass funnel, and having covered it with a piece of muslin, pour on the remainder of the menstruum. When this has disappeared from the surface, pour on diluted alcohol until twelve fluidounces of tincture has passed. Set this aside, and proceed with the percolation until two pints more of liquid has passed. Evaporate this on a water bath at a moderate heat, to four fluidounces, add it to the reserved tincture, and after thoroughly agitating the mixture, allow it to stand until clear; decant the clear liquid, throw the remainder with the dregs on a filter, and add, finally, sufficient diluted alcohol to make the fluid extract measure a pint.

Extractum Cocci Fluidum.—This preparation is suggested merely for the convenience of the apothecary, either for dispensing in prescriptions, or as a coloring agent. The common cochineal mixture of ten grains of cochineal, and twenty grains of carbonate of potassa, which at seasons is so frequently called for, may be made extemporaneously by putting the carbon-

ate into the vial with the water, and adding twenty minims of the fluid extract. To guard it against decomposition the fluid extract is made partly alcoholic.

Take of Cochineal, four ounces, (troy.)

Diluted alcohol, a sufficient quantity.

Powder the cochineal to the fineness of a sieve of fifty meshes per inch, mix it with its bulk of fine sand, moisten it with half a fluid ounce of diluted alcohol, press it slightly in a funnel prepared for percolation and pour on diluted alcohol so that it shall slowly pass. Reserve the first five fluidounces, and continue the percolation until a pint more of tincture is obtained. Evaporate this at a temperature below 130° on a water bath, in a porcelain dish, to three fluidounces. Lastly, mix it with the reserved tincture and strain if necessary. Each minim represents half a grain of cochineal.

On Lard and Simple Ointment.—During the past twelve months the pages of the *Journal de Pharmacie et de Chimie* have been the vehicle of a series of reports on Pharmaceutical preparations, with a view to the pending revision of the Codex, which are remarkably detailed, and embrace a much larger list of preparations than will probably be adopted in that work. The November number contains the report of MM. Vuafart, Durozier & Comar, on cerates and ointments.

Lard.—In the preparation of lard for Pharmaceutical purposes, the crude fat should be carefully separated from the membranes and pieces of flesh, cut in small pieces, and then malaxated in repeated portions of cold water until this remains clear, when it should be tried in a tinned vessel with a moderated heat until the melted fat which at first is milky from the presence of water, becomes perfectly clear and anhydrous. It should then be strained into earthen pots, stirred occasionally till it chills, (but not so as to incorporate any air with it,) to prevent granulations of a stearic nature from forming. The pots should then be securely covered, (waxed or varnished paper will be suitable,) and kept in a dry, cool cellar. Veal, beef, and mutton suet should be prepared in the same manner.

Benzoinated and Populinated Lard.—However carefully prepared, lard tends to get rancid by age and exposure. In 1843

and 1849, M. Deschamps broached the idea of its being protected by certain balsamic resins, and suggested *benzoinated* and *populinated* as prefixes, denoting that the lard had been digested with benzoin and poplar buds. I have tried both of these means of retarding the oxidation of fat, and find the latter far superior in its power for this purpose. In 1851 a sample of red oxide of mercury ointment was prepared with poplar-bud ointment, and presented to the class of the Philadelphia College of Pharmacy, and I had occasion this year exhibit to the same specimen, which continues free from any visible evidence of deoxidized mercury, and retains its peculiar odor, though twelve years have elapsed. The objection to this agent is that it colors lard and ointments orange yellow. I have used it advantageously in mezereum and other colored ointments, and for beef marrow, which it odorizes. This is the period of the year when the buds of *Populus balsamea* should be procured. *Balsam of Peru* incorporated or heated with lard possesses the same quality.

Balsamic Lard.—The report to which we have alluded contains the following formula :

Take of Lard, newly rendered, 1000 grammes.

Balsam of Tolu, 10 “

Mix them and liquify the lard in an earthen vessel by aid of a water bath, digest for some time and strain through muslin. The lard should be stirred during the cooling to prevent granulation. Balsamic lard as thus prepared is perfectly white and of an agreeable tolu odor. The Reporters recommend in making *mercurial ointment* to employ 460 parts of balsamic lard and 60 parts of wax melted together as the vehicle for 500 parts of mercury ; using the fatty matter in a semifluid state by agitation, a plan of proceeding well-known in this county, and used by Mr. Coppuck and Dr. Squibb. Thus made, mercurial ointment is free from rancidity and of an agreeable odor. The authors recommend balsamic lard as a vehicle for narcotic ointments, from extracts, and for those of sulphur, the iodides of lead, and of mercury, and of tartar emetic.

Elemi in Ointments.—The resinous matter of elemi, or at least one of its resins, is peculiar in its relations to the oils and fats, and is often the occasion of difficulty. In making the

unguentum elemi of the London Pharmacopœia, the elemi and turpentine should be first liquified by heat and strained if necessary, and then the suet and oil previously melted is incorporated by active stirring. The tendency is for a portion of resin to be precipitated by the fats and become unmanageable. The Dublin Pharmacopœia requires 4 ounces of elemi fused, to be incorporated by fusion with 16 ounces of white wax ointment.

Recently the following prescription was dispensed :

Take of Tolu, two drachms,	troy.
Elemi, half an ounce,	“
White Wax, an ounce,	“
Lard, an ounce and a half,	“
Powdered Camphor, six drachms,	“ Mix.

No directions were given for the preparation. The tolu and elemi were first softened by heat, the camphor then added, which soon formed a liquid mixture ; the wax was then added, which also incorporated with the others ; but when the lard was finally added, a portion of the resinous matter was precipitated, amounting to one-sixth of the whole, which refused to unite with the fluid portion. The latter on straining formed an elegant ointment.

Mouchon's Colocynthin.—In this Journal, March, 1862, page 138, the writer gave a notice of several substances which had been used under the name of colocynthin. Since that time he has had occasion to prepare some of the so-called colocynthin, and employed the following recipe and manipulation.

Take of Colocynth pulp. (deprived of the seeds,) thirty-two ounces.

Animal Charcoal (of good quality, unpurified,) thirty-two ounces.

Alcohol sp. gr. 835, a sufficient quantity.

Dry the pulp at a moderate temperature until friable, and reduce it to powder by passing through a No. 40 sieve. The animal charcoal should also be in powder of the same fineness. Close the neck of a two gallon glass funnel with a fluted cork and some cotton or wool lint, then a layer of sand of half an inch, on this four ounces of the charcoal, and lastly, the colocynth powder intimately mixed with the charcoal, packed firmly, the whole covered with muslin and a layer of sand. Alcohol is now

poured on, and if the materials have been properly packed its passage will be sufficiently slow; but if too loose, the rapidity of the percolation must be regulated by means of a cork so that it will pass by drops. A bright yellow concentrated tincture is obtained which should amount in all to five or six pints. If convenient, to regain a portion of the alcohol it may be effected in a well-tinned still or glass retort by aid of a water bath, but the product is lighter colored when the evaporation is conducted at a temperature not exceeding 130° F., to dryness or until a soft resinoid mass is obtained, which can be pulled like candy. This after exposure in layers acquires a friable consistence, and is finished. About seven ounces were obtained from thirty-two ounces of the best French pulp, or about six per cent. of the crude drug. Dose from one-half a grain to two grains.

ON GLYCERINATED EXTRACTS, ETC.

By T. S. WIEGAND.

Glycerinated Extracts.—The difficulty of incorporating extracts in ointments, syrups and mixtures generally, has been one that many of us have frequently experienced. The most simple and unobjectionable method I have yet seen is to work up any given extract with an equal weight of pure glycerin, added gradually during the process of mixing it. This obviates the trouble of mixing the extract in any one of the many ways which extracts are now so commonly employed. It is an excellent manner in which to exhibit belladonna when required to be applied to the breast, or to tumors, and the facility with which it can be washed off is a very great advantage over the ointment which is so commonly directed. Of course, double the weight of the extract prescribed must be used when thus prepared.

Drying Lozenges.—The frequent warm and wet weather we have had this winter has much increased the difficulty of drying lozenges, and to obviate the delay thus occasioned I have used a case made tight at the joints by varnishing or painting, and securing a close joint where the lid shuts by covering the edges of the box with leather like the swell box of an organ. The fastenings are to be so arranged that as they are driven up they

draw down the lid tighter upon the edges of the box. In the bottom of the box a tray is fitted, upon which quicklime in small pieces is to be placed, and the lozenges placed over it upon plates of glass or sheets of tin, supported by cleets nailed to the sides of the box. The lid should be closed at once and fastened tightly. After a lapse of a few days, the lozenges will be found sufficiently dry and hard to cut and box. This method has proved very satisfactory in my own experience.

Compound Infusion of Gentian.—I would simply note that the method recommended by James T. Shinn, on the 30th page of this journal for the year 1862, has proven satisfactory in my experience for several years past.

ON PURE PEPSIN.

By M. BRUKE.

Pepsin can be precipitated from its solutions by agitation with cholesterin, phosphate of lime, or animal black; dissolved in water containing phosphoric acid, it can also be precipitated when neutralized with lime water, and is contained in the precipitate of phosphate of lime without being in combination with that salt.

On these facts, M. Bruke has based a new process for the preparation of this important substance; he has obtained it in a state of purity unknown to this time, and which permits him to rectify a good number of statements in regard to it in the treatises.

Two recent hogs' stomachs are digested in weak phosphoric acid, at the temperature of 100 F., which detaches the mucous coat in fragments. The solution is filtered and the residue again digested at the same temperature. The filtrate should be clear, and yellow prussiate should not indicate albumen. Lime water is now added until the neutralization is nearly complete as tested by litmus, the precipitate collected, expressed, and dissolved in water containing hydrochloric acid. The clear solution is again precipitated by lime water, redissolved by hydrochloric acid and filtered.

Into a flask, sufficiently large to contain the liquid, a funnel with a long beak is introduced, into which a solution of chole-

terin prepared cold with a mixture formed of four parts of alcohol of 94 per cent. and one part of ether. By contact with the acid liquid the cholesterin separates in very fine particles and rises to the top of the liquid; when the coagulum acquires the thickness of about two centimetres, the funnel is removed and the liquid shaken quickly and frequently, by which the pepsin is removed from solution by the cholesterin; afterwards filter, wash the filter with acid water and then with pure water, till the washings lose their acidity and reaction with nitrate of silver. Now in treating with ether, the cholesterin is dissolved whilst the adhering water forms an opaque layer with the pepsin, which is agitated repeatedly with fresh portions of ether until nothing remains, but an aqueous liquid from which the adhering ether passes off, and leaves a transparent solution of pure pepsin.

When acidulated with dilute hydrochloric acid, this liquid possesses energetic digestive properties, dissolving fibrine readily in an hour.

As has been remarked, that pepsic liquid is far from partaking of the reactions which are usually considered the characteristics of pepsin. Thus it is not affected by any of the reagents which indicate albumen, as per example by nitric acid, tincture of iodine, tannin and bichloride of mercury. This last point is of great importance, since the pepsin analysed by M. Schmidt was prepared by precipitation with bichloride of mercury.

Nitrate of silver renders the liquid lightly opaline. Bichloride of platina occasions a sensible troubling; it is precipitated abundantly by the acetates of lead even in the presence of free acetic acid. It follows from this that our ideas of pepsin ought to be modified and its analysis made.—*Jour. de Pharm.* Dec. 1862.

ON THE METALLURGY OF PLATINUM.

By MM. H. SAINTE CLAIRE DEVILLE AND H. DEBRAY.

The manufacture and uses of platinum are interesting in the highest degree to chemists, especially to theoretical chemists, who in their analytical operations so frequently make use of the remarkable properties of this precious metal. We therefore ask permission to present some observations and experiments we

have recently made to complete the new system of metallurgic treatment we published some years ago in the French scientific serials. *

One of us has had an opportunity of witnessing our processes applied with great success by a clever English manufacturer, Mr. Matthey, of London. An ingot of platinum of 100 kilogrammes was melted in a quick lime furnace with lighting gas and oxygen. Under the influence of these powerful agents, the mass became so liquid that it filled exactly with metal every part of the mould, and reproduced all its imperfections with unexpected precision.

The experiment occupied four hours; but as it took about half this time to heat the furnace itself, four hours, short time as it is for such an operation, may be considered as the maximum.

The aspect of this glowing liquid mass was a sight not easily to be forgotten. For this large operation, Mr. Matthey used the gasometer for melting ingots of from 20 to 25 kilogrammes, for which he has daily occasion. It is a surprising fact that, having on this occasion for the first time replaced the manganese or sulphuric acid, usually used in the preparation of oxygen, by chlorate of potash, Mr. Matthey decomposed at one time, and without taking any precaution, 22 kilogrammes of it mixed with its weight of manganese. The gas was disengaged with prodigious rapidity; but there is really no danger of an explosion, provided the tubes are sufficiently large to carry off the gas. There is even no sensible increase of pressure in the apparatus.

A new process for moulding platinum is now used, invented by M. Heraeus, manufacturer at Hanau, and applied with considerable success in London. M. Heraeus, by the advice of his illustrious master, M. Wohler, has adopted for several years the processes we published on the treatment of platinum, which, in the hands of a clever manufacturer and an enlightened chemist, have undergone already, as we anticipated, simplification and improvement. M. Heraeus runs the platinum into moulds of

* See *Annales de Chimie et de Physique*, 3d Series, vol. lvi. p. 355, and vol. lxi. p. 5; *Annales des Mines*, 5th Series, vol. xvi. p. 1, and vol. xvii. p. 71.

forged iron, the use of which we had given up; but he obviates all the inconveniences arising from the fusibility of the iron by placing at the bottom of the mould a leaf of platinum 1 millimetre thick, which supports the first contact of the fused metal.

Owing to this precaution the ingots are very perfect, entirely free from those blisters so often visible upon cast metals, from which platinum is no more exempt than the other metals when it has been carelessly moulded.

From observations made in England it is found that the alembics used in the manufacture of concentrated sulphuric acid are much more durable when fabricated with the cast platinum which Mr. Matthey now exclusively employs for this purpose. The platinum united by Wollaston's process is porous, and frequently allows the hot acid to leak through. We ought, moreover, to warn the manufacturers of platinum that the sulphuric acid prepared with Peruvian nitrate of soda contains a little chlorine, which acts upon the gold solder of platinum alembics with remarkable facility. For this reason it is very desirable to substitute for the gold in these vessels platinum melted by our oxyhydrogen blow-pipe, and spread over the surfaces, to be united by the autogenous soldering processes.

This process, utilised for some time in England, gives excellent results, and from the great difference in value between gold and platinum, effects considerable saving.

One of us has had the opportunity of seeing in the laboratory of Mr. Matthey some tubes cast by this process, and drawn out without defect; and in the laboratory of MM. Desmontis, Chapius, and Quennessen some experiments tried upon cast platinum which promise valuable results.

Unhappily for the developement of the platinum manufacture, the enormous price of these alembics has driven the makers of sulphuric acid to substitute for them vessels of lead glass. Seven-tenths of the concentrated acid are now made in England with glass vessels, of which the first cost and expense of repairs are scarcely equal to half the annual interest of the sum necessary to provide a large platinum distillation vessel. The improved apparatus we offer to manufacturers—an improvement already realized in England, as we can vouch—consists in an alembic capable of concentrating at least from two to four tons

of acid every twenty-four hours, at a price, at most but a fifth or sixth of the apparatus actually in use. By this reduction in price we believe that the workers in platinum will preserve to this metal a market,—a reduction to the interest of all, to the interest of our laboratories, our chemical manufactories, and to the platinum makers themselves. The developement of platinum manufactures depends also on the Russian Government, which was the first to offer liberal incentives to improve and develop it. From information furnished us by M. Jaunez, a distinguished engineer well acquainted with the Oural mines, the yield of platinum ore is easily capable of three-fold increase were the sale of these ores freed from all trammels. It is impossible to say at present to what rate the metal itself might fall if extracted by the economical processes we have published. Nor can we foresee the purposes to which the metal may be advantageously applied, its excessive price hindering all trials. It is to be hoped that the Government of Russia, which on this point has shown a real love of progress, and has profited by the counsel of its most distinguished scientific men, will make an entire change in a manufacture from which science benefits so largely.

We have called the attention of manufacturers to the advantages accruing, in some instances, from the use of iridium and platinum alloys, particularly of the natural alloy obtained by the direct fusion of the ores in an oxidising atmosphere. To facilitate the introduction of iridium into platinum, we have tried to find an economical way of extracting, by Wollaston's process, pure iridium from the residuums of platinum manufactures, residuums existing in large quantities in all the great factories of Europe. We have had recourse to the method of attacking by baryta, and in the interest of manufacturers we ask permission to describe summarily the operations. We took:—

Osmide of iridium, or residue †	100 parts
Nitrate of baryta	100 “
Baryta	200 “

After being pulverized and well blended, the mixture is put into an earthen crucible and made red hot. The black matter and

† These residuums were kindly lent to us by Mr. Matthey, whom we take this opportunity of thanking for the intelligent and disinterested assistance he has in many instances afforded us.

fritt resulting from this calcination is pulverised anew, and is put by small portions into cold water until the mass is well moistened. Nitric acid is carefully added to it, and the mixture is heated in a sand bath, either before a good chimney to carry off the osmic acid vapors which arise, or in a distilling apparatus; if it is wished to collect them, they can be fixed by caustic ammonia. When all osmic odor has disappeared, and enough nitric acid has been added to make the mass perfectly liquid, pour into the liquid a very small quantity of hydrochloric acid until the whole becomes of a yellowish red color. Heat again; then pour into a funnel stopped up with gun-cotton, or into a sugar mould. The liquid, which flows slowly, contains chlorides of platinum, iridium, rhodium, and salts, with common metal bases. But the nitrate of baryta, being insoluble in liquid acids, remains on the funnel impregnated only with metallic chlorides. Displace these with a little pure water, as in the sugar refining process, and pure nitrate of baryta remains, not being carried away in any appreciable quantity with the dark thick liquid flowing through the funnel. We thus obtain;

Nitrate of baryta 474 parts.

This nitrate of baryta, which contains a little unattacked substance, serves for a fresh operation.

As to the liquid containing the precious metals, a few drops of sulphuric acid will free it from all trace of baryta, and then it is to be treated by the processes described in our memoir to which we refer.

In this way we have obtained, with three specimens of platinum prepared by precipitation by means of iron:—

	I.	II.	III.
Iridium with platinum	33.1	38.7	52.9
Rhodium	20.0	5.9	8.1
Palladium	0.2	—	—
Osmium, common metals, and loss .	46.7	55.4	39.0
	<hr/>	<hr/>	<hr/>
	100.0	100.0	100.0

In the first of these operations the amount of unattacked matter was 0.15 per cent.; in the second, 0.2 per cent.; in the third it was imperceptible. These figures annul M. Clau's objec-

tion that, in our analytical process founded on the same method, the rhodium was not entirely attacked by the baryta.

Mr. Matthey has modified this method by replacing the baryta, which we used to diminish the fusibility of the mixture, and which is very expensive in England, by nitrate of baryta itself, which is very cheap.—*Lond. Chem. News, Sept. 1862, from Comptes-Rendus.*

THE CINCHONA FORESTS OF SOUTH AMERICA.*

BY DR. KARL SCHERZER.

(Translated for the American Journal of Pharmacy.)

When the frigate Novara left Batavia, I cherished the hope that our stay in South America would be sufficiently long to allow of undertaking a journey to the cinchona forests; and to be able to answer through personal observation, certain questions, entrusted to us by Dr. Junghuhn, of Lembang, in regard to the conditions essential to the growth of the species of cinchona cultivated in Java. Instead, however, of the expedition as originally planned, it was only allowed me to tread the classic soil where Humboldt gathered the first scientific treasures; and this only for so short a time, that my visit had to be limited to the capital of Peru, and its immediate neighborhood. A scientific excursion to the cinchona forests lying far in the interior was out of the question, under the existing circumstances. I did not neglect, however, to translate the inquiries confided to me by Dr. Junghuhn, into the English and Spanish languages, and to forward copies of these interesting desiderata to such persons in Chili, Peru, and Bolivia, who from their mercantile position, or their interest in scientific discussions, seemed to be able to contribute towards deciding several questions respecting the growth of the cinchona in its native country. I took pains, at the same time, to collect for myself information on this subject, as often as opportunity offered, and by a very fortunate accident (as it appeared to me) I met in Lima Mr. Campbell, a merchant of Bolivia, who for many years has been living in Tacna, and has paid particular attention to the cinchona trade.

*From the Voyage of the Austrian frigate Novara, around the earth, in 1857, 1858, and 1859. Vienna, 1862.

For the chief export of this important drug is from Bolivia, and not from Peru, as its commercial name "*Peruvian Bark*" might lead one to suppose. This designation dates from the time when the Bolivia of to-day (in whose forests the cinchona chiefly grows) was an integral part of Peru, and was called Upper Peru: while from the present republic of Peru, scarcely any Peruvian bark is exported, and that collected in New Granada and Ecuador, and known under the name of Pitaya bark is of a quality far inferior for medicinal purposes.

The most important fact, which I am at present able to communicate is in correction of a wide spread error, that by the greed of gain, the extermination of the cinchona tree in its native home is near at hand, and that the supply of the remedial agent derived from its bark, which has become to the practising physician as indispensable as the Peruvian potato is to the working classes, will soon no longer suffice for its daily increasing use. The Calisaya region (i. e. in which the Cinchona Calisaya, whose bark is most prized and valuable, occurs most abundantly, and thrives the best) stretches from one degree north of Lake Titicaca to the twentieth degree of south latitude. In the forests of Cochabamba, viz. between this point and La Paz, the cinchona occurs more abundantly than in those forests lying parallel to La Paz, in which it is now found only at such a distance from the city, that the cost of transportation through the wilderness amounts to 17 pesos per hundred-weight. The forests lying more southerly, on the contrary, are still untouched by the axe of the *cascarilleros*. The largest proportion is exported from Tacna and Arica, a small quantity only, suspected of being contraband, goes northward from Lake Titicaca, in order to be shipped through Port d'Islay.

From the district above mentioned 8 to 10,000 hundred-weight of bark could be annually gathered for an indefinite period, without the least danger of exterminating the tree. Since 1845 the exportation of cinchona bark from Bolivia has been a monopoly of the government, which conveyed the right to a company which bound itself under a certain sum to the yearly export of 4000 hundred-weight.

This company paid the *cascarilleros*, or persons who gathered the bark in the cinchona forests, 25 to 30 pesos, for every hun-

dred-weight of Calisaya bark delivered in La Paz, the chief city of Bolivia. But this arrangement had but partial success, for speculation and avarice, as well as the continual political unsettlement, and alterations in the government of the country, stood in the way of the quiet development of this branch of industry and trade. Each new President wished to draw the greatest possible gain from the natural treasures of the soil, and the sum demanded for the right to export the cinchona bark constantly advanced. In 1850, a native mercantile house in La Paz paid to the bark gatherers 60 pesos for every hundred-weight, besides an export tax to the government of 25 pesos per hundred-weight, while the contractors bound themselves to a yearly collection and export of 7000 hundred-weight. The exorbitant price paid to the *cascarilleros* occasioned an enormous quantity of Calisaya bark to be brought to La Paz. In order to restore the average, and not to fill the market far beyond the demand, the government now prohibited the cutting and gathering of the cinchona bark. Within 18 months 18,000 hundred-weight had been delivered, and this circumstance caused such a fright among the monopolists that they declared themselves bankrupt, and were only spared from complete ruin by the moderation of the government, which took possession of the whole stock, paid the speculators with certificates, redeemable in certain periods, and concluded a new contract with a native mercantile house, in which the selling price of an hundred-weight of bark delivered in La Paz was limited to 65 pesos clear of further export duty.

As soon as the present stock is exhausted, it is probable that the prohibition on the cutting of the Calisaya bark will be again withdrawn, and by the serious lesson learned in the mean time, the excessive and dangerous eagerness of the *cascarilleros* for collecting may be prevented.

My visit in Java, was just at the time when chemical experiments were being tried on the bark of the young cinchona trees, and the fact that in these the costly alkaloid was not found, excited the apprehension that the bark of these trees, cultivated with such great care, would perhaps be entirely destitute in the land of their adoption—under altered climatic and geognostical circumstances—of their most valuable constituent. But the information obtained by me in South America shows that even in

its native home, the quinia is met with only in the bark of the older trees, and its quantity bears a proportion to the age of the branch. The bark of trees which are 50 years and more in age are the richest in quinia. To the ignorance of this fact must probably be attributed the annual felling by the cinchona-gatherers, or cinchona-hunters (*Cazadores de Quina*) during the time of the Spanish rule, of 800 to 900 cinchona trees of 4 or 5 years of age, in order to obtain the 110 hundred-weight of bark which was sent from Payta around Cape Horn to Cadiz, exclusively for the use of the royal court.

In reference also to the quantities annually exported from South America, and consumed in European preparations, very considerable errors have crept in, even in scientific circles.

The total export of cinchona from South America, from 1830 to 1860 has not exceeded according to reliable accounts 200,000 hundred-weight* (the seven inferior kinds not included) while of Calisaya, the real red bark (*cascarilla roja*) certainly not more than 120,000 hundred-weight has been sent abroad. While thus the yearly export of Peruvian bark appears to be far less than is generally supposed, a species of cinchona has lately for the first time been discovered in the forests of Bolivia, between Tarija, Cochabamba, and La Paz, whose bark is said to possess the same characteristics as that of the *Cinchona calisaya*. The curate in Tarija has offered for sale nearly 3000 hundred-weight of this valuable bark (called *Sucupira* by the Indians.) The position of the forests is so favorable for export, that the freight from Tarija to Iquique, the nearest sea port, is but from 8 to 10 pesos per hundred-weight.

Upon referring to these communications, and to the not inconsiderable increase which has resulted from the successful propagation of the cinchona in Java and the East Indies, all apprehension may disappear that this noble tree is nearly exterminated, and suffering humanity threatened, by ignorance

* Weddell, on the contrary, states, that one manufactory, that of Pelletier, Delondre, and Levaillaux in Havre, had used in one year (1837) not less than 17,400,000 hundred-weight of the best cinchona bark in the production of quinia. This is either a typographical error, or a colossal exaggeration.

and vandalism, of being deprived of one of the most active and important of the physician's remedies.—*Vierteljahresschrift für Praktische Pharmacie*, Bd. xii. H. I. G. J. S.

ON THE PREPARATION OF CRYSTALLIZABLE ACETIC ACID.

BY M. TILLMANS.

Take *six* parts of acetate of soda in crystals, fuse the salt in its water of crystallization, and evaporate to dryness, and melt the dry mass by a carefully increased heat. The residue weighs but half as much as the original salt. This is distilled with *five* parts of ordinary sulphuric acid to dryness. The product is apt to contain sulphuric acid, which is removed by a little litharge and redistilling which gives the acid pure. By exposing the product to the cold till it crystallizes, and draining off the liquid portion by which the remainder is left as a monohydrate, six parts of acetate of soda gives $2\frac{1}{2}$ parts of glacial acetic acid.—*Jour. de Chim. Med.*, Sept. 1862.

ARTIFICIAL PRODUCTION OF ICE.

An apparatus has lately been proposed in Europe for the artificial formation of ice of somewhat the following construction.

From a strong solution of ammonia (.895 sp. gr.) the gas is developed, and liquified by cooling under a pressure of 10 atmospheres. After removal of the pressure it is conducted into a vessel containing a saturated solution of chloride of calcium, and into this solution, which, without being frozen, has been reduced to the temperature,—22 (Fahr.) a number of metal tubes are placed containing water, which is congealed in a few minutes. During the freezing the tubes are kept in a rotary motion.

The preparation of a solution of ammonia of the requisite strength is not so easy as it appears. Distillation is not sufficient, but a solution of the usual strength must first be prepared, put in bottles, surrounded by ice water, and ammonia then passed into it, until no more is absorbed.—*Vierteljahresschrift für P. Pharmacie*, Bd. Vol. xii. H. I. G. J. S.

ON THE RELATIONS OF DEATH TO LIFE IN NATURE.

BY J. D. DANA.

1. The creation of a plant with "seed in itself," as Moses states in his concise description, was the simultaneous institution of life and death. It was the establishment of an incoming and outgoing stream, to be in constant flow as long as the kingdoms of life should last—an incessant renewal of youth, and rejection of age.

All life is a system of progressing change in cycles—the germ first, then the embryo, the young, the adult, and last, the seed or germ again, to continue the rounds; the adult sooner or later disappearing from the field of progress, and then from the sphere of existence. Death is implied in the very inception of the scheme.

2. Death is also in every step of the process of life. For the living being is throwing off effete matter during all its growth; the change is constant, so that with each year a large part of the material in our bodies has passed away and been replaced by new. Moreover, the force which had been expended in making a cell, or particle of tissue, goes to form a new cell or particle when the former dies, and was needed for the new formation going on. Force is not lost or wasted, but used again. There is unceasing flow, and in this flow is life; its cessation is death.

3. The kingdom of plants was instituted to turn mineral matter into organic, that the higher kingdom of animals might thereby have the means of sustenance; for no animal can live on mineral matter. Now this living of animals on plants implies the death of plants.

Again, the rocks of the globe are, to a great extent, made of the remains of dead animals.

4. The chemistry of life, also, required death. Life in the plant or animal, if sustained by means of nutriment, and continued consuming, with no compensating system, would evidently end in an exhaustion of any finite supply. A perfect adjustment was therefore necessary, by which nutriment should sustain life, and life contribute to nutriment. Now the plant takes up carbonic acid from the atmosphere, appropriates the

carbon, and gives back the oxygen. Yet there is no tendency to an exhaustion of the atmospheric carbonic acid, or an oversupply of the oxygen; for death strikes an exact balance.

The death of the plant ends in a change of all its carbon into carbonic acid again. Thus the plant, as it grows, decomposes carbonic acid to get carbon, and then ends in making, by its decay, as much carbonic acid, and restoring it to the atmosphere. Thus, through death the compensation is perfect. The atmosphere loses only what it receives. Again, as just now observed, the plant, in growing, gives oxygen to the atmosphere; but in the decay of the plant, the carbonic acid formed is made by taking up the same amount of oxygen. The same carbon that lost oxygen when becoming a part of the plant, takes it again at the decay. The system is hence complete. The parts play into one another in perpetual interchange. Take death and decay out of the system, and it would not work.*

Animal life, as above stated, was made to subsist on plants. But the scheme is so well managed as not to disturb the balance made by the vegetable kingdom alone. For all the carbon of animals comes from plants. The plants which feed an animal, and which, on decay, would have turned into carbonic acid, become changed into carbonic acid in the course of the growth of the animal, so that the whole amount of carbonic acid which the animal makes, is only what the plants would have made if left to natural decay. Thus the higher kingdom of life is introduced and sustained, and yet the balance remains undisturbed. The system is perfect.

5. Again, one part of the animal kingdom, through every

* In early geological history, as is generally believed among geologists, there was an excess of carbonic acid in the atmosphere; and this excess was removed to a great extent, by the growth of plants during the Carboniferous era. Vegetable material decaying under water does not undergo complete decomposition, and thus part of the carbon is left behind; and so far as there is carbon left, there is an actual abstraction of carbonic acid from the atmosphere, by the process of growth. The Coal-era was a period of great marshes; and by this means the needed purification of the atmosphere was effected, preparing it for land life. The amount abstracted now by the same means is very small, and may be balanced by the carbonic acid from mineral sources and volcanoes.

class, is made to eat up the other part, or at least live on it. The flesh-eaters are of all grades, low and high, from the infusorium and maggot, to the lion and man. Some take what is already dead or decomposing; others kill and eat. On this subject we observe:

(1.) Death is in the system of nature—death from earthquake, lightning, and all the moving forces, as well as by natural decay; and the creation of carnivorous animals was hence in harmony with the system.

(2.) Various noxious animals are held in check by the carnivorous species.

(3.) By means of flesh-eaters, the diversity of animal species subsisting on a given amount of vegetation is vastly increased, and a wider expansion is given to the animal kingdom.

(4.) Putrefaction of the dead is prevented by a multitude of scavengers, who at the same time turn the flesh into food for the vegetable kingdom; and thus plants feed animals, and animals feed plants,—one of nature's circles again.

The last two principles mentioned are of profound importance. The vegetable kingdom is a provision for the storing away or magazing of force for the animal kingdom. This force is acquired through the sun's influence or forces acting on the plant, and so promoting growth; mineral matter is thereby carried up to a higher grade of composition, that of starch, vegetable fibre and sugar, and this is a state of concentrated or accumulated force. To this stored force animals go, in order to carry forward their development; and moreover, the grade of composition thus rises still higher, to muscle and nerve, (which contain nitrogen in addition to the constituents of the plant,) and this is a magazing of force in a still more concentrated or condensed state. There are thus five states of stored force in nature—three in the *inorganic*, the solid, liquid, and gaseous; and two in the *organic*, the vegetable and animal.

Now what is the provision to meet this last and highest condition? Is this magazined force left to go wholly to waste by the death and decomposition of the plant-eaters? Just the contrary: an extensive system of flesh-eaters was instituted which should live upon it, and continue it in action in sustaining animal life among successive tribes. The flow is taken at its height,

and the power is employed again and again, and made gradually to ebb. What is left as the refuse, is inorganic matter—the excreted carbonic acid, water, and excrements, with bones or any stony secretions present. Thus the flow starts at the inorganic kingdom, and returns again to the inorganic. Moreover, in the class of quadrupeds, (mammals,) the flesh of the herbivores (cattle), is among the means by which the animal type is borne to the higher grade of the carnivores. The true carnivores, besides, take the best of meat. Whales may live on the inferior animals of the sea; but the large forest flesh-eaters take beef and the like.

There is another admirable point in this scheme. The death and decomposition of plant-eaters would have rendered the waters and air, locally, at least, destructive to life. It is well known that it is necessary in an aquarium to have flesh-eaters along with the plant-eaters and plants. And when in this way the living species are well balanced, the water will remain pure, and the animals live on indefinitely. If not so balanced, if an animal is left to decay, the waters become foul, and often everything dies. Putrefaction and noxious chemical combinations follow death, because, in life, the constituents, carbon, hydrogen, nitrogen, and oxygen, are in a constrained state, at the furthest remove from what chemical forces alone can produce; and hence when the restraint is taken off at death, the elements fly into new conditions according to their affinities. Now animals, dying yearly by myriads, are met at death by an arrangement which makes the dead contribute anew to animal life as its aliment, and in this very process the flesh ultimately comes out innocuous, and is at last so far changed to the inorganic condition as to be the best of fertilizers for plants. Part of the process of getting rid of the great fleshy carcasses, consists in their minute subdivision by the feeding of larvas of insects, and, further, an infinitesimal division of the insect as the food of the infusoria,—which again may become the nutriment of larger animals, to go the rounds once more. But the final result is, as stated, *plant-food*—largely through the processes of digestion and excretion, but part through the decomposition of animals that are too small and readily dried up to prove offensive.

Thus the carnivorous tribes were necessary to make the system of life perfect.

One word respecting the necessity of a check on the excessive multiplication of individuals. Nature, as just now observed, is a system of constantly varying conditions—of changing seasons, winds, clouds: of inconstancy, under law, in all forces and circumstances. At the same time, the growth of a species requires the nicest adjustment of special conditions in each case. On this account the reproductive powers in species is in many cases excessively large, so that the various accidents to which the eggs or young would be exposed, might not cause their extermination. This provision opened the way for occasional excessive multiplication, and required a check from carnivorous races.

6. Finally, could death be prevented in a system of living beings in nature without constant miracle? How should the earth be managed to secure it against death? It would be necessary to still the waves, for they are throwing animals and plants on the coast to die; to still the winds, for they are ever destroying in some parts of their course; to still even the streams and rains. With winds and waves, not only helpless animals and plants, but men's houses, ships, and boats, would now and then be destroyed, in spite of prudent precaution and holy living. But if we still the waves, the winds, and the streams, the earth would rot in the stagnation, and here again is death!

We thus learn, that in life the fundamental idea of reproduction implies death; the processes of life are the processes simultaneously of death; the stability of the system of life requires death; the vegetable kingdom is made to feed animals, and the animal kingdom, while containing plant-eaters, demands flesh-eaters for its own balance, for the removal of the dead, and to make out of dead flesh the proper food for plants, thus to pay its debt to the vegetable kingdom. Hence, death pervades the whole system of life in its essence and physical laws; and it could not be prevented in a world of active forces except by a constant miracle; and this would be an annihilation of nature, that is, of a system of law.—*Am. Journ. Science and Arts*, Nov. 1862.

CARDAMOMS.

[The following article from the *London Chemical News* will give a reason for the high price of cardamoms outside of commercial difficulties.—ED. AM. J. Ph.]

How many English people know anything of cardamoms? Among the tens of thousands of daily visitors to the universal repository of products and fabrications at South Kensington, are there a hundred, or even a score, who could go straightway to the case, or even to the court, in which the article cardamom is exhibited? Tell us, well instructed reader, replete with the contents of the official catalogues,—tell us off-hand what it is; or tell us in three guesses, whether it is a sea-shell, a dried fish, or a conjuring toy—something to eat, or drink, or wear—a vegetable, mineral, or animal substance? When you have excogitated a wholesome conclusion of ignorance, go into the Indian collection at the top of the north-east staircase. There you will find, among the vegetable substances from which drinks are concocted, two or three bottles labelled with the name of the article you seek, and you may construct your own natural history of the brown husky beans, something like rough over-grown almonds, that are there set forth as the growth of Travancore, and other districts of India. Perhaps in the Chemical Department you may find also a 'bottle labelled "Tincture of Cardamom," and in that deep red fluid you will see the stomachic for the sake of which cardamoms are cultivated, farmed, and taxed.

Yes, farmed and taxed. The commodity of which Englishmen know so very little is an article of revenue to their Indian Government, and the collection of that revenue matter of bargain between the Government and a contractor or farmer. The affair is managed in this wise:—Once in five years the collector at Calicut puts up to auction the cardamom farm of the district of Wynaad. The district includes seven talooks on the sides of those lesser ghauts that terminate in Malabar, the western mountain chain of the peninsula. Wynaad, the chief of these talooks, giving its name to the whole, is especially favored by nature in the matter of cardamoms. A rugged and inaccessible region—suspended, as it were, between Mysore and Mala-

bar, and long a debatable as well as border land—it would have no commercial value but for its remarkable aptitude for the production of this pungent spice. The native rajahs gave the Company some trouble in the days of the Mysore chieftains, and the Company avenged itself by taking possession of the soil and the crops forever. The purchaser of the cardamom farm of Wynaad acquires at once an exclusive right of taking the whole crop of cardamoms at a fixed price. The grower must gather the crop, dry and clean it, take it to a place agreed upon, and there deliver it up at the price fixed for him by the Government, usually about a fourth of the market price. The contractor may use his own weights and pay in his own coins, leaving the poor peasant-cultivator to get redress, if he can, for errors and frauds. To conceal or secretly sell any of the pods is an offence against the revenue laws and an injury to the contractor, for the prevention of which armed men watch the collection of the crop and search houses in which any of it may be supposed to be hidden. Of course the grower is a smuggler, and equally of course the contractor is a cheat and oppressor. A transaction with the Government—the Government of Queen Victoria—has handed over the chief produce of the soil of Wynaad, the chief property of its mountainous inhabitants, to a stranger. He has bought the right to rob them with impunity, taking without their leave every grain of their principal crop, paying them a third or fourth of what it would fetch at the nearest town, and punishing them if they attempt to withhold but a single bag of their produce. And after having made a profit of thousands of rupees out of the rapacity of the contractor and the helplessness of the grower, the Government stops the export of the crop until it has paid toll for the privilege of going out of the country.

ARTIFICIAL TOURMALINES.

To the Editor of the *Chemical News*.

SIR,—In reply to your correspondent's inquiry relative to a method of forming "Herepath's Artificial Tourmaline," I beg to inform him that he will find the requisite information in the

following extract from Bird and Brookes' "Natural Philosophy," page 503 :—

"Dissolve 50 grains of disulphate of quinine in two fluid-ounces of acetic acid, and two of proof spirit, warmed to 130° F., in a very wide-mouthed flask or glass beaker; then slowly add 50 drops of a mixture of 40 grains of iodine in an ounce of rectified spirit; agitate the mixture and then set it carefully aside for six hours, in an apartment maintained at a temperature of about 50° F. The utmost care must be taken to avoid any motion of the vessel; indeed, all accidental vibrations should be guarded against by suspending the vessel by a string, or by allowing it to rest on a mass of cotton wool. If, in six hours, the *large* laminæ of the salt have not formed, warm the fluid with a spirit lamp, and when it has become clear, add a few drops of the solution of iodine in spirit. The large laminæ form on the top of the fluid, and should be removed carefully by gliding under one of them a circular piece of thin glass. The specimen should be drained by resting the edge of the glass on a piece of bibulous paper, but it must not be touched on account of its extreme fragility; if any small crystals adhere to its surface, they must be washed off by pouring over it a few drops of watery solution of iodine. When dry the specimen should be placed for a few minutes under a bell-glass by the side of a watch-glass containing a few drops of tincture of iodine; and lastly, a little very fluid Canada balsam should be dropped on it, and a thin glass cover applied without heat. Specimens may thus be obtained of extreme thinness, and half an inch in diameter or even larger, possessing scarcely the slightest color, and yet completely polarising transmitted light."

I am, &c.

JAMES W. YOUNG.

Chem. News, Sept. 27, 1862.

QUANTITATIVE DETERMINATION OF STARCH.

BY DR. DRAGENDORFF.

Starch has been estimated hitherto by mechanical separation, by fermentation and weighing the carbonic acid, by conversion into sugar and finding the amount of the latter by means of Fehling's standard copper solution, or finally by difference. Of these methods none are worthy of entire confidence in the

majority of circumstances. Fehling's method, the best in most cases, has little value as usually conducted, since the more delicate forms of cellulose pass into sugar by digestion with acids, while the insoluble albuminoids yield both by treatment with acids and diastase, substances which reduce alkaline copper solutions.

Dr. Dragendorff of the Rostock Laboratory proceeds with starch determinations as follows: the pulverized substance after drying cut all hygroscopic moisture at 212° is digested for 18—30 hours at a temperature of 212° in 10—12 times its weight of a solution of 5—6 parts of hydrate of potash in 94—95 parts of anhydrous alcohol. The digestion must take place in sealed glass tubes, or in a silver vessel which admits of closing perfectly. By this treatment the albuminoid substances, the fats, the sugar and dextrin are brought into such a condition that simple washing with alcohol or water suffices to remove them completely. The chief part of the phosphoric and silicic acids is likewise rendered soluble. The starch grains are not affected, neither does the cellulose undergo alteration, either qualitatively or quantitatively. In fact this treatment serves excellently to isolate starch grains for microscopic investigations. Besides starch and cellulose nothing resists the actions of alcoholic potash save portions of cuticle, gum, and some earthy salts.

When the digestion is finished, it is advisable, especially in case the substance is rich in fat, to bring the contents of the tube upon a filter while still hot, as otherwise potash salts of the fat acids may crystallize out. It is also well to wash immediately, first, with hot absolute alcohol, then, with cold alcohol of ordinary strength, and finally, with cold water until these several solvents remove nothing more. In the analysis of matters which contain much mucilage, as flaxseed, the washing must be completed with alcohol of 8—10 per cent., to prevent the swelling up of the residue.

The filter should be of good ordinary (not Swedish) paper, should be washed with hydrochloric acid and water, dried at 212° , and weighed. When the substance is completely washed, the filter and its contents are dried, first at 120° and finally at 212° . The loss consists of albuminoids, fat, sugar and a part of the salts of the substance, and when the last three are separately

estimated, it may serve to control the estimation, by elementary analysis, of the albuminoids.

The filter with its contents is now reduced to powder or shreds, and the whole is heated with water containing 5 per cent. of hydrochloric acid until a drop of the liquid no longer reacts blue with iodine. The treatment with potash leaves the starch grains in such a state of purity from incrusting matters, that their conversion into dextrin proceeds with great promptness and is accomplished before the cellulose begins to be perceptibly acted upon. By weighing the residue that remains from the action of hydrochloric acid, after washing and drying, the amount of cellulose, cork, lignin, gum and insoluble mineral matter is found. By subtracting these from the weight of the substance after exhaustion with potash, the quantity of starch is learned with great accuracy. The only error introduced by this method lies in the solution of some saline matters by the acid. The quantity is, however, so small as rarely to be appreciable. If needful, it can be taken into account by evaporating the acid solution to dryness, incinerating and weighing the residue. By warming with concentrated malt extract at 132° , the starch alone is taken into solution, and no correction is needed for saline matters. If it is wished to determine the sugar produced by the transformation of the starch, a weaker acid must of course be employed. In case of mucilaginous substances, the starch must be extracted by digestion with a strong solution of chloride of sodium, to which the requisite quantity of chlorohydric acid has been added, and the residue should be washed with water to which some alcohol has been added.—S. W. J. *Am. Jour. Sci. and Arts*, Jan. 1863, from *Henneberg's Journal für Landwirthschaft*, 1862.

CONTENT OF STARCH IN VARIOUS SEEDS.

By DR. DRAGENDORFF.

Dragendorff, applying the method already noticed, for estimating starch, found the following percentages, which are interesting, either as serving to compare the results of his method with those obtained by others, or on account of including some seeds of which hitherto no analyses have been attempted. Dragendorff finds that in the seeds of colza and mustard the

starch does not exist in the form of grains; but in an unorganized condition (*formlose Stärke* of Schleiden). In the seeds of the Leguminosæ, Dragendorff supposes a new and undescribed carbohydrate to exist, which has been confounded with starch hitherto, but which, unlike starch, is soluble in potash solution.

	Loss by drying.	Loss by treatment with alcoholic solution of potash.	Starch.	Cellulose, cork, cuticle, lignin, mucilage, and insoluble mineral matters.
Wheat,.....	13.2	18.7	59.5	8.6
Wheat flour,.....	15.8	12.6	68.7	2.9
Rye,.....	11.0	23.2	59.7	6.1
Oats,.....	11.9	22.1	46.6	20.4
Barley,.....	11.5	23.5	57.5	7.5
Timothy seed,.....	12.6	29.9	45.0	12.5
Rice (hulled),.....	13.3	17.1	61.7	7.9
Peas,.....	5.0	34.2	37.3	23.5
Beans (white),.....	16.7	45.1	33.0	5.2
Clover seed,.....	10.8	60.0	10.8	18.4
Flax seed,.....	7.6	46.1	23.4	22.9
Mustard seed,.....	8.5	51.5	9.9	30.5
Colza seed,.....	5.8	63.5	8.6	21.1
Teltow turnips,*.....	dry substance	79.8	9.8	10.4
Potatoes,.....	dry substance	31.6	62.5	5.9

—*Am. Journ. Sci. and Arts*, Jan. 1863.

S. W. J.

ON THE DETECTION OF POPPY AND OTHER DRYING OILS IN OLIVE AND ALMOND OILS.

By M. WIMMEC.

It is known that the olein of the drying oils is distinguished from that of the fatty oils by not being convertible into elaidic acid, and consequently not becoming solid. Professor Wimmec has lately proposed a convenient method of making elaidin, which can be employed to determine the presence of drying oils in either oil of almonds or olives. In treating iron filings by nitric acid, in a glass flask, nitrous acid vapors are evolved, which are conducted by a glass tube into water on which the oil to be examined is poured. If the oil contains but a small quantity of poppy oil it will form drops on the surface, whilst the oil of olives or almonds will be converted entirely into crystallized elaidin.—*Jour. de Pharmacie*, Dec. 1862.

* A sweet and mealy turnip grown on light soil for table use.

ON THE MANUFACTURE OF COPAL OIL VARNISH.

By M. H. VIOLETTE.*

There are three principal varieties of copal used in commerce—the hard, the semi-hard, and the soft. The two first are employed in making oil-varnish: the latter, with less resisting power, is used for interior appliances.

Hard copal is procured from Calcutta or Bombay, that from Calcutta being the best. Semi-hard copal comes from Africa. It is highly necessary that commercial lots should be composed of identical resins; they are made up of various qualities, which the buyer should be able to distinguish. (See “*Histoire Naturelle des Drogues Simples*,” by M. le Professor Guibourt.

By heating, with steam, a vessel containing hard copal, some fragments soften more or less, while others remain intact. On throwing various fragments of hard copal into a bath of melted tin, at about 300°, some of the fragments melt and spread, while others resist, and are fused only at a much higher temperature.

The solvents of hard and semi hard copals are not known at present; that they exist is certain, because the resins flow naturally from the tree which produces them, in the form of a limpid liquid, which thickens and hardens by exposure to the air, losing by evaporation the solvent essential oil.

Notwithstanding the numerous trials of chemists and practical men, there is no other way of dissolving these copals in the mixture of essence of turpentine and oil, the vehicle used in

* This important investigation is extracted from the “*Memoirs*” of the Imperial Society of Science, Agriculture and Art, of Lille. The author condenses in these words the history of the manufacture of varnish:—“The manufacture of varnish is as yet only a manual art, and certainly no science. The art of making copal-oil varnish, described by the monk Theophilus, in the twelfth century, has since then made no sensible progress. The processes were long unknown to any but the makers; hence the number of worthless and often impracticable receipts which encumber books on the subject. The first descriptions were given by Watin, in his ‘*L’Art du Peintre, Doreur et Vernisseur*,’ published in 1772; then came Tingry’s treatise; and, lastly, the remarkable treatise, ‘*L’Art de Faire les Vernis*,’ by Tripier-Deveaux, published in 1845.” M. Violette’s work is to be continued.

making varnish, than by previously decomposing them by heat. The extent of this alteration, effected by heat, is of great importance, for the higher the temperature employed, the deeper is the color of the varnish, which, in the operation, loses its primitive limpidity.

The author has determined by experiment the following fusing and distilling temperatures of copals :—

	Fusion.	Distillation.
Hard Copal,	340°	360°
Semi-hard Copal,	180°	230°

The above copals, when melted only, dissolved neither by heat nor cold, in essence of turpentine, their solubility corresponds, or is relative to a certain degree of decomposition, which the author set himself to determine practically.

Our author's experiments led him to the conclusion, that hard and semi-hard copals become soluble in a mixture of essence and oil, only after losing 20 to 25 per cent. of their weight. Beyond a loss of 25 per cent, they become more and more soluble, but at the same time darker, and yield less varnish, owing to the increased loss. He shows, also, that the least degree of coloration corresponds to the lowest temperature necessary—that is to say, about 360° ; he asserts, in consequence, that to obtain the largest quantity of the best varnish, the copals must lose 25 per cent. of their weight, by distillation at 360°.

M. Violette adds, however, that copal which has lost 10 per cent. of its weight, or even less, will readily dissolve in essence of turpentine, thickened by prolonged exposure to air and light: the actual cause of this singular modification of the essence is unknown. Were it possible, by a short, easy and cheap process, to reproduce this state, it would effect a great improvement in the manufacture of varnish.

In its actual condition, copal which has lost 10 per cent. of its weight by distillation does not dissolve in ordinary commercial essence, whether deprived of its water by mixing it with absorbing agents, or several times distilled.

Copal oil, says the author, is a product worthy of attention, as it represents about one-fourth the weight of the copal. It is limpid and yellowish. Its density about 0.80 ; it burns in the air, giving a bright light: it is soluble in oil and essence of tur-

pentine, it dissolves soft and semi-hard copals,* it might then be usefully employed in making varnish, especially if it could be deprived of its strong and persistent odor; its employment would compensate completely for the loss of copal by distillation, and the manufacturer would thus avoid loss of material.

M. Violette closes his memoir by expressing the wish that intelligent manufacturers should try to produce soluble copal, and enrich industry with this new product.—*London Chem. News*, Nov. 29, 1862.

ON THE LUMINOSITY OF PHOSPHORUS.

BY DR. MOFFAT.

If a piece of phosphorus be put under a bell-glass and observed from time to time, it will be found at times luminous, and at others non-luminous. When it is luminous, a stream of vapor rises from it, which sometimes terminates in an inverted cone of rings similar to those given off by phosphoretted hydrogen; and at others it forms a beautiful curve, with a descending tint equal in length to the ascending one. The vapor is attracted by a magnet; it is also attracted by heat, but it is repelled by cold. It renders steel needles magnetic, and it is perceived only when the phosphorus is luminous. Results deduced from daily observations of the phosphorus in connection with the readings of the barometer, the temperature and degree of humidity of the air, with directions of the wind, for a period of eighteen months, show that periods of luminosity of phosphorus and non-luminosity occur under opposite conditions of the atmosphere; the former being peculiar to the equatorial, while the latter is peculiar to the polar current. By the catalytic action of phosphorus on atmospheric air, a gaseous body (superoxyd of hydrogen) is formed, which is analogous to, if not the same as, atmospheric ozone, and it can be detected by the same tests. The author has found, by his usual tests, that *phosphoric* ozone is developed only when the phosphorus is luminous. Periods of luminosity and periods of atmospheric ozone take place under similar atmo-

* A long time ago, we distilled hard copal, and well remember that the viscous liquid obtained by rapid distillation dissolved hard copal.—Bw.

spheric conditions, and the conditions of non-luminous periods and periods of non-atmospheric ozone are the same. From the author's observations in connection with this matter, which extend over several years, it appears that 99 per cent. of luminous periods and 91 per cent. of ozone periods commence with decreasing readings of the barometer and other conditions of the equatorial current; and that 94 per cent. and 66 per cent. terminate with increasing readings and the conditions of the polar current. Luminous periods commence and luminosity increases in brilliancy on the approach of storms and gales, and ozone periods commence and luminosity increases in quantity under similar conditions. There is, it would appear also from these observations, an intimate connection between the approach of storms, the commencement of luminous and ozone periods and disorders of the nervous, muscular and vascular systems. Here the author gave the dates of many storms and gales, and the occurrence of diseases of the above class, showing their coincidence; and in corroboration of what he had stated, he mentioned the fact that there was a concurrence in the issuing of Admiral FitzRoy's cautionary telegrams and these diseases. He also stated that he views the part performed by ozone in the atmosphere as being similar to that performed by protein in the blood; the latter giving oxygen for the disorganization of worn-out tissues in the animal economy,—the former giving oxygen to the products of decomposition and putrefaction, and rendering them innocuous or salutary compounds. With these views he has used phosphorus as a disinfectant; and from the results he has obtained, he believes that by using ozone artificially formed by the action of phosphorus in localities tainted with the products of putrefaction, just in sufficient quantity to tinge the usual test-paper, all diseases of the pythogenic class would be prevented. Although the data are too few to theorize upon. Dr. Moffat hoped that he would be excused for pushing the matter beyond a simple statement of facts and observations, as many facts had been observed in nature which strongly corroborated all he had advanced. Ozone, he observed, is in all probability formed wherever there is phosphorescence; and this is by no means an uncommon phenomenon. It is seen in life and in death, in the animal and vegetable kingdoms, and in the

mineral kingdom. Here many instances of phosphorescent bodies were enumerated, among which the night-shining Neries was named as becoming particularly brilliant with a direction of wind from points of the compass between east and south; and the fact that the sea becomes luminous on the approach of storms by marine animals floating on its surface was noticed. Many phosphorescent minerals were named; the fluor spar being particularly pointed out as being not only phosphorescent on slight increase of temperature, but as giving off ozone. The author concluded by observing that it is not improbable that atmospheric ozone is formed by the phosphorescence of these and similar bodies, and pointed to the absence of ozone and weak magnetic action during cholera periods, which are periods of non-luminosity, and to the disappearance of cholera with the setting in of the equatorial current, which is ozoniferous and favorable to luminosity. The aurora, the author thinks, may yet be proved to be a display of luminosity.—*Am. Journ. Science and Arts*, Nov. 1862.

PREPARATION OF BISMUTHIC ACID.

By MM. BEDEKER AND DIECHMANN.

When a solution of nitrate of bismuth is treated by a concentrated solution of cyanide of potassium employed in excess, it produces, as is known, a deep-brown powder, and the liquid is colored red.

This brown precipitate, which has heretofore been considered as BiO_3 , is in reality hydrated bismuthic acid $\text{BiO}_5 + 2\text{H}_2\text{O}$. It is purified by ebullition and washing in distilled water to remove cyanide of potassium.

The water of hydration is only disengaged at the temperature of 302 F.

This reaction is not produced by the cyanate of potassa which the cyanide usually contains, as the authors tried the pure cyanate without a parallel result.—*From Central Blatt, in Jour. de Pharm. Dec. 1862.*

ON THE PRESENCE OF ARSENIC AND THALLIUM IN THE MEDICINAL PREPARATIONS OF BISMUTH, AND ON A MEANS FOR PURIFICATION.

BY W. BIRD HERAPATH, M. D., F. R. S. L. AND E.

The recent case of arsenical poisoning in Wiltshire has brought prominently before the public the fact that the processes adopted in the manufacture of the medicinal preparations of bismuth are very imperfect, and permit the presence in those most useful articles in the *Materia Medica*, of large quantities of a highly dangerous and noxious substance, namely, arsenic in some form or other ; it therefore becomes most desirable that the attention of manufacturers should be called to this circumstance, in order that they might produce an article free from such dangerous impurities. Since my return from Hindon, I have examined fourteen different samples of this medicinal agent, amongst which were preparations obtained from the dispensaries of the Bristol Royal Infirmary, the Bristol General Hospital, as well as samples from some of the first pharmaceutical establishments of this city and Clifton also, and in each case I have invariably detected the presence of arsenic. Some of these samples have contained as much as one grain of arsenic in 433 grains of the article examined, others only one grain in 1000 grains ; such quantities, although minute, when given in the usual medicinal doses, yet under a similar combination of circumstances to those occurring in the case in question, might lead to very serious consequences, as it would be impossible to establish the fact of a criminal administration of this poison if bismuth in its present impure condition had been administered medicinally.

Some preliminary experiments have shown me that it is possible to remove arsenical impurities by a very simple process, and one which would not add much to the cost of the material. On boiling either of the insoluble salts of bismuth with a sufficient quantity of solution of caustic soda or potassa, the arsenic is quickly removed in the soluble form, and the residue, on treatment the second time with the same reagent, and subse-

quently well washing it by means of large quantities of water, and decantation, is rendered perfectly pure and fit for medical purposes. I am not aware whether this process has been hitherto proposed, but it has succeeded perfectly in purifying some samples of nitrate and carbonate upon which I have tried it in my own laboratory.

The greatest objection to this mode of purification is of course the change which the caustic alkali exerts upon the preparation employed, as the nitrate will be wholly converted into the yellow oxide, whilst the carbonate will be also partially so changed. This process therefore entails the resolution of the oxide in nitric acid, and its renewed precipitation as "Trisnitrate" by the addition of water in the usual manner; whilst the waste acid obtained from this precipitated and purified nitrate may be employed for the resolution of the changed and purified carbonate, whence the bismuth may be again thrown down in the pure form by the addition of carbonate of soda to that solution. Thus, by carefully economizing the nitric acid used in the process of manufacture, very little additional expense would be entailed by following this method of purification. A few words may be advisable upon the best means of detecting and estimating the arsenic in preparations of bismuth, as it is not an easy matter to do so by the plan recommended by Rose, and many chemists may readily overlook small quantities like these by depending upon such a method of proceeding. But reduction by hydrogen gas furnishes us with both a ready method of detection and even of quantitative estimation, and in fact was the plan adopted by me in all these analyses. One precaution is necessary however in the quantitative analysis, in addition to all those which ensure the purity of the acids, zinc, and apparatus employed, which is to select a tube of hard green glass, about a quarter of an inch in diameter; then by means of the blow-pipe draw it out in successive portions, to narrow its calibre and reduce its weight, and for convenience in heating and weighing, to subsequently bend it into a triangular form; and having carefully counterpoised it, now attach it to the hydrogen gas apparatus (furnished of course with an exit tube filled with chloride of calcium) by means of a little tube of india-rubber, and having ar-

ranged proper supports, it only remains to apply heat at three or four portions of the tube simultaneously by separate spirit-lamp flames properly arranged, and of course having previously allowed the air to escape from the apparatus, and ensured the purity of the gas evolved by heating one of the bends of the tube for some time previous to the introduction of the weighed portion of the bismuth to be tested into the tubular funnel of the apparatus, whence it should be carefully washed down into the gas-bottle, by directing a stream of distilled water by a pipette or the ordinary wash-bottle. In this way twenty grains have sufficed for very accurate analysis, as the hydrogen escapes free from arsenic, as may be proved by lighting it at the extremity of the tube and testing it by Marsh's method from time to time in the ordinary way. In the calculation of the percentage, it is necessary to remember that the arsenic is obtained as metal, whereas it existed in the sample as an arsenite, either of lime or bismuth; consequently it must be converted into the theoretical quantity of arsenious acid.

It is generally the case that the evolution of gas stops during some minutes after the introduction of the nitrate of bismuth, probably from the production of ammonia by the reduction of the nitric acid, but on the further addition of hydrochloric acid it goes on as before. In this way three or four films of arsenical deposit are obtained, and in great beauty, from the quantity of bismuth I have already named.

I need scarcely say that the hydrochloric acid employed was proved to be chemically pure and free from arsenic, not only by Reinsch's method, employing electrotypic copper for the purpose, but by the more rigorous method of passing the hydrogen gas evolved by it *during one hour* through a red hot glass tube; this latter method detects a quantity of arsenic perfectly inappreciable by Marsh's usually trusty method of testing for arsenic. The alkaline liquid obtained after thus boiling one sample of carbonate of bismuth, about 1 lb. in weight, has furnished me with evidence of the existence of another metallic impurity in bismuth preparations. This will very probably turn out to be *Thallium*, which I have nearly identified, but I am now engaged in the elucidation of this matter.

The hydrogen gas flame, when a sample of bismuth contain-

ing thallium is tested by Marsh's method in a darkened room, by means of a white porcelain plate, gives a brilliant green light where the flame impinges on the plate; the arsenical flame is violet, and when sulphur is present we have a beautiful blue. I have found that thallium may be obtained as a deposit in the red hot tube like sulphur and of a reddish-brown color. On heating this whilst the current of hydrogen is still passing through the tube, the green flame is again rendered evident, if it had previously disappeared.

The occasional existence of arsenic as an impurity in the bismuth of commerce was a fact well known to me, but it was not until after my return from giving evidence before the Wiltshire magistrates that I became aware of its almost universal presence; and permit me to express my acknowledgments to Dr. B. W. Richardson for having called my attention to this circumstance, and my subsequent experiments have fully confirmed the truth of his observations.

It is not for me to decide whether this was the source of all the poison in the case in question; *however, I think not*, for we should then have to imagine that at least one ounce of impure bismuth had been taken by the patient in order to account for the quantity of arsenic found by me; and, although all the *arsenic had been retained* in the viscera of the deceased, yet, by some extraordinary means, the whole ounce of bismuth had been evacuated with the exception of a mere trace, for scarcely one-twentieth part of a grain remained—a difficulty, which, in my opinion, it is impossible to overcome.

P. S.—Since the above was written I have found three samples of bismuth tolerably free from arsenic—only the most minute traces to be obtained in the tube. These samples were, two prepared by the Messrs. Howard & Sons, and a specimen of carbonate made by Mr. Schacht, of Clifton; all other samples, more than twenty in number, were decidedly very arsenical.—*Lond. Pharm. Journ., Jan., 1863.*

ON ESCHWEGE'S PURE NAPHTHA, AND ITS USE IN THE
ARTS AND MANUFACTURES.

By JOHN TUCK.

Wood naphtha, pyroxylic spirit, or the hydrated oxide of me-

thyle, C_2H_3G,HO , discovered in the year 1812 by Taylor, forms, as is well known, one of a numerous class of homologous bodies derived from carbide of hydrogen radicals, the most important of which is the hydrated oxide of ethyle, or alcohol.

These bodies differ from each other in their elementary composition merely by a definite number of equivalents of carbon and hydrogen; thus the compound radicals of naphtha and alcohol are respectively methyle C_2H_3 , ethyle C_4H_5 ; and their corresponding oxides, the hydrated oxide of methyle or naphtha, C_2H_3O,HO , hydrated oxide of ethyle or alcohol C_4H_5O,HO ; and their other salts differ only by C_2H_2 .

One great and distinguishing difference, however, between these two analogous bodies is the mode of their production; naphtha never being produced by any fermentation whatever, while, on the other hand, alcohol is only produced by fermentation in any commercial quantities. They both have many properties in common when *in a pure state*, being limpid, colorless liquids of pungent and agreeable taste, free from the slightest disagreeable odor, and miscible with water in all proportions. The essential oils, resins, some of the alkaloids, and a great number of saline compounds, especially the deliquescent salts, are readily soluble in both; hence their great importance in the arts and manufactures.

As stated before, naphtha is never produced by fermentation, and is only obtained as a bye-product of the destructive distillation of wood, and is found in the liquid products of the distillate, along with acetic acid, acetone, several ethereal liquids, tarry and resinous matters, and oily hydrocarbons, some of which are in a partially dissolved state.

These condensed liquid products, after being allowed to rest some time in a tank or other suitable vessel, separate into two layers by the tarry and resinous matter sinking to the bottom, whilst the spirituous and acid liquor forms a supernatant layer, which is usually drawn off, and in its passage made to percolate, through a filter formed of coarse gravel, by means of which a great portion of the tarry and other matters mechanically suspended are separated.

The next process is to separate the spirituous from the acid

portion of this crude liquor, which is done in two ways ; firstly, by distilling it direct from the crude liquor ; secondly, by neutralizing it first by lime, and then distilling. In both cases, however, heat is applied until about one-fifth of the contents of the still is condensed in the receiver. The weak spirit thus obtained is next subjected to repeated distillation, in order to obtain the spirit in a more concentrated form, and which is finally rectified by distillation with lime, or with a mixture of lime and caustic potassa. The naphtha as thus obtained, and as is usually met with in the market, is colorless, and of a peculiar, strong and disgusting odor, and not at all potable even after very large dilution. For these reasons it has hitherto been of no service in some of the finer requirements of the arts and manufactures; and when formerly used, it was only on account of the enormous price of alcohol in this country, previous to the granting of that great boon, methylated spirit. It is stated on good authority that the United Kingdom produces about 66,000 gallons of naphtha annually. This peculiar, strong, and offensive odor and taste in naphtha is owing to the presence of certain volatile oily hydrocarbons necessarily formed in the process of its manufacture, as may be seen from this rough outline of it, and from which it has hitherto been found utterly impossible to free it, on a commercial scale by any known process. Now, however, such can be done, and to M. Eschwege belongs the credit of having succeeded in removing entirely these oily or other impurities, and of rendering the naphtha *free from odor, potable, and fit for many, if not all, of the purposes to which spirit of wine is now applied.*

This process of purification is effected *without any chemical change whatever taking place, and in a manufacturing point of view can be readily and economically carried out.* Samples of naphtha and various other spirits in their crude state, and after being purified by this process, are to be seen at the present International Exhibition,* Class 5, south-east passage of the Eastern Annexe.

Having, through the kindness of M. Eschwege, had some of his purified naphtha placed at my disposal for examination, I

* This paper was written in October.

found it to be, as stated, entirely free from any disagreeable odor; as odorless in fact as spirit of wine, and quite potable; in order to test which I drank it in one and two drachm doses, diluted with four parts of water, *without experiencing nausea, sickness, or the slightest uncomfortable sensation*. I noticed, however, one thing in connection with it, that it did not taste so fiery on the tongue as alcohol. In order to meet every objection, and as a conclusive proof of the nature of this potable liquid, I submitted it to the action of oxalic acid, and thereby converted it into the beautiful crystals of oxalate of oxide of methyle ($\text{MeO}, \text{C}_2\text{O}_3$), and this test must be allowed by all to be a positive proof of its being naphtha.

All of the essential oils and odorous substances used in perfumery are, as far as my experiments have gone, just as soluble in it as in spirit of wine; and some of the perfumes which I have made, using only this pure naphtha as a solvent, have a much finer and more delicate odor, and have even been preferred to others made in the usual way with spirit of wine. I find the following essential oils are as soluble in purified naphtha of specific gravity .812, and in some cases even more so, than in the usual spirit of wine of commerce 56 o. p.:—*Ol. Anethi, Anisi, Anthemidis, Bergamotæ, Cajeputæ, Carui, Caryophylli, Cassiæ, Cinnamomi, Citronellæ, Crotonis, Cymini, Geranii, Juniperi, Lavandulæ, Limonis, Menthæ, Origani, Pulegii, Rhodii, Rosmarini, Sabinæ, Verbenæ.*

I think the above facts are quite sufficient to prove that we have in pure naphtha a new and highly valuable menstruum for use in perfumery, and in making the various essences for flavoring and other purposes, and which it is very probable will prove as great a boon to this, as methylated spirit has to other arts and manufactures. It is also well adapted for making the finer kinds of spirit varnishes, to be used in cases where even the little odor of methylated spirit is objectionable, if anything freer from odor and as effectual could be obtained at a reasonable price, and in cases where spirit of wine is often even now used, such as re-polishing furniture in inhabited houses, in varnishing walls to prevent damp coming through, for mixing with water to form evaporating lotions in the sick room, for burning in lamps as a cleanly and cheap source of heat in experiments, etc., for

singeing horses in cases where the odor of methylated spirit is objectionable; and, although I have made no experiments on this subject, I should think it was well adapted for making transparent soap: and there is no doubt that it will be used for numberless purposes which experience will prove it to be adapted for.

As regards its use in pharmacy, I see no valid objection against its being used in the manufacture of all tinctures (as its solvent powers are almost identical with spirit of wine,) and in every case where spirit of wine is now used either as a solvent or from its preservative effects; but I wish it to be distinctly understood that I do not advocate its use in any one case, until official permission is given for using it.

Since writing the foregoing, I find that Mr. Draper, of Dublin, has published a paper in this Journal, on the "Purification of Pyroxylic Spirit," in which he states, "I am of opinion that, in its present form, the patent process just described is not adapted to the purification of wood-spirit on a manufacturing scale." This paper called forth a letter from M. Eschwege in the "Chemical News" of November 15th, in which he states that the cost of purification will be under sixpence a gallon of full strength on a large scale, and he has offered, to quote his own words, "with a view to facilitate researches into its properties, to place at the disposal of any one scientific institution not too distant from the British Museum, an apparatus which I had made, to come to practical results, and to have there purified, under my directions, any quantity wanted merely for scientific purposes.—*Lond. Pharm. Journ.*, Jan., 1863.

Wilton, near Salisbury, Nov. 19th.

A NEW DIALYSING MEDIUM.

M. Ern. Guignet has experienced some difficulty in the employment of parchment paper as a dialysing medium in certain cases, in which it is acted on by the solutions. He appears to entertain some doubts of the truth of Professor Graham's proposition, that the parchment paper is actively concerned in the result by virtue of its colloidal property of becoming hydrated, and has sought to obtain some other substance which should admit of more general application. The medium which he recom-

mends is *porous or unglazed earthenware*, such as is used in the construction of porous cells for batteries; in fact, he seems to have used battery cells in some of his experiments. He states that, with the employment of this medium, he has obtained all the important results described by Professor Graham, together with several which would have been impossible to realize with parchment paper. The following are some of his experiments, which are interesting and suggestive, although not sufficiently numerous or precise to be conclusive:—A porous vessel filled with pure water was placed in a solution containing gum and sugar; at the end of twenty-four hours a great part of the sugar had traversed the porous vessel and passed into the water, but not a trace of the gum.

Caramel and bichromate of potash were in a similar manner rapidly separated; the salt passing through the porous vessel into the pure water, and leaving the caramel behind. A drop of the mixed solution allowed to fall upon the porous porcelain, gave a brown spot, surrounded by a yellow circle of bichromate, which the author considers evidence of the greater diffusibility of the salt.

A porous vessel of pure water was placed in an ammonio-cupric solution of cotton; the water became blue, while the cotton remained in the outer liquid.

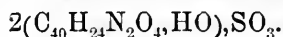
Experiments were also made to replace water by other liquids, such as bisulphide of carbon, and essence of turpentine. Iodine, sulphur, and naphthaline pass through porous earthenware with very different degrees of rapidity, when dissolved in bisulphide of carbon, the first being much behind the others.—*Phar. Jour. London, January, 1, 1863.*

ON VARIATIONS OBSERVED IN THE WATER OF HYDRATION OF SULPHATE OF QUININE.

By MM. E. MILLOW AND A. COMMAILLE.

The authors state, that the most recent treatises on chemistry give an imperfect and erroneous idea of the state of hydration of the sulphate of quinine of commerce.

The formula of the anhydrous sulphate of quinine is thus expressed :—



The salt of this definite composition (which the authors have verified with great care) is not obtained in the drying ovens where the commercial sulphate of quinine is desiccated, but it may be always obtained by exposing the salt of commerce in glass tubes for five hours to a temperature of 120° Cent. The salt undergoes no alteration even if the temperature be raised to 155° Cent. Five different commercial samples of sulphate of quinine gave the following percentages of water :—

1	. . . . .	5.16 per cent.
2	. . . . .	5.71 “
3	. . . . .	11.15 “
4	. . . . .	11.79 “
5	. . . . .	13.30 “

The authors recommend that Pharmacutists who consume large quantities of this expensive febrifuge should make known the amount of water they tolerate in it, and this figure admitted, the standard thus formed should be always appealed to, and the manufacturers controlled. They then show the large amount of water that may be introduced into the salt without altering its appearance. The commercial salt was submitted to repeated crystallization, and its purity established by analysis; it was then introduced into different atmospheres, each maintained in a particular hygrometric condition; for example, over sulphuric acid, either more or less concentrated or saturated with humidity, at temperatures varying from 15° to 18° Cent.

Placed over oil of vitriol, the sulphate of quinine undergoes but an incomplete desiccation, there yet remains a portion of water which is lost at 120° Cent.; three experiments determined this percentage of water at

1	. . . . .	4.64 per cent.
2	. . . . .	4.71 “
3	. . . . .	4.84 “
Mean	. . . . .	4.71 “

The desiccation does not proceed further if the temperature does not exceed 17° Cent.; but if this heat be exceeded, a further diminution of the percentage of water occurs. The air

in which the salt was being dried over oil of vitriol having acquired a temperature of 30° Cent., the proportion of water in the salt was reduced to 0.93 per cent. It is presumed that the salt maintained at this temperature for one or two months might become anhydrous. Kept several days over sulphuric acid containing five equivalents of water, at a temperature below 15° Cent., the salt retained a quantity of water represented by the following numbers:—

1	5.84 per cent.
2	5.99 “
Mean	5.91 “

These conditions correspond to a tension of 2.674 m.m., and indicate a very dry atmosphere. Over sulphuric acid containing eighteen equivalents of water, at 15° Cent., corresponding to a hygrometric tension of 10.6 m.m., different samples of sulphate of quinine, containing from 10 to 18 per cent. of water, did not sensibly vary in weight.

If anhydrous sulphate of quinine, dried at 120° Cent., and commercial varieties be placed in a very humid atmosphere at 15° to 18° Cent., they progressively increase in weight. Under these circumstances the anhydrous salt took up, in five days, 28.77 per cent. of water.

Another sulphate of quinine containing 18 per cent. of water, and of which the weight did not vary when the salt was exposed over sulphuric acid containing eighteen equivalents of water, absorbed a further quantity of water, which in ten days amounted to 14 per cent., making a total of 32 per cent. of water finally contained in the salt. Another sample which, having been exposed to sulphuric acid containing five equivalents of water, only retained 5.91 per cent. of water, took up 33 per cent. more in eight days, making a total of 39 per cent. of water in the salt. Notwithstanding the great variations thus produced in the chemical and therapeutical value of sulphate of quinine, the appearance of the salt is not sensibly changed.

These experiments appear to show that the state of hydration of this salt is not definite or capable of expression in equivalents. This is a case not without its analogues. It is observed

in several minerals, oolites particularly, where it is almost impossible to fractionize the water at different degrees of the thermometer, so as to express the quantity in a regular formula.

Whatever may be the value of these remarks in theory, they have an important practical bearing, showing, as they do, how large an amount of water may be contained in sulphate of quinine, otherwise pure, without altering sensibly its physical characteristics, of the presence of which, therefore, the appearance of the salt affords no indication.—*London, Phar. Jour.* January 1, 1863, *from Répertoire de Chimie.*

ON A NEW PREPARATION OF PURE OXYGENATED WATER.

BY M. DUPREY.

By passing a very rapid current of pure carbonic acid into distilled water, and adding at intervals binoxide of barium, perfectly pure oxygenated water is obtained.

When the quantity of carbonate of baryta is sufficiently large to obstruct the passage of the gas, the clear liquid, containing all the oxygenated water, must be decanted, and the current of carbonic acid again passed into it. As soon as more binoxide of barium is thrown in, a fresh quantity of oxygenated water is formed. In this way we obtain water strongly charged with perfectly neutral and pure oxygenated water, which can be concentrated under an air pump. Care must be taken to maintain a sufficiently rapid current of carbonic acid, so as to be always in excess of the small and gradually added quantities of binoxide of barium, which must, moreover, be finely powdered, as large pieces escape decomposition.

In all my experiments, the carbonic gas has been exactly washed by passing through flasks containing carbonate of lime. It is then evident that to its action alone is to be attributed the production of oxygenated water; and the experiment shows, moreover, that it can be obtained as well with oxacids as with hydracids.

The best re-agent I have been able to find for oxygenated water is decidedly permanganate of potash, which, when poured

into water containing even a very small portion of oxygenated water, disengages all its oxygen. This body serves to estimate oxygenated water, the phenomena of decoloration being very apparent.—*Lond. Chem. News, Dec. 1862, from Comptes-Rendus.*

ON THE PRESENCE OF PIPERINE IN THE SCHINUS MOLLIS.

BY M. LANDERER.

The berries and leaves of the *Schinus molle*, one of the most graceful of the Eastern terebinthaceæ, have a burning flavor, similar to pepper, whence it has obtained among the natives the name of "pepper tree." Every part of this vegetable is filled with a milky, very acrid juice. The leaves bruised and applied to the skin produce the effect of a strong sinapism.

In searching for piperine in the berries, which resemble Indian pepper, M. Landerer treated them with alcohol, density 0.840, expelled the alcohol by distillation, and digested the residuum twice with a potash solution to dissolve the resin. The portion which resisted the potash was redissolved in alcohol, and the liquid left to spontaneous evaporation. The product, purified by the repeated action of animal charcoal and several crystallizations, possessed all the properties of piperine. M. Landerer admits, however, that this result needs confirmation.—*Lond. Chem. News, Dec. 1862. from Wittstein Wierteljahr, xi. 72.*

ON NITRONAPHTHALINE, NAPHTHYLAMINE, AND ITS COLORED DERIVATIVES.

BY M. Z. ROUSSIN.

It is well known that the hydrocarbon called benzol, by fixing the elements of hyponitric acid, forms nitrobenzol. United in this way as an acid molecule, nitrogen, by an intelligible reduction, may assume an alkaline character, and remain in the compound. The new base, aniline, is then obtained, the mobile elements of which adapt themselves readily to the phenomena of oxidation, or of substitution.

Naphthaline gives two parallel derivatives, nitronaphthaline and naphthylamine. It was interesting to ascertain whether this latter substance would equally produce the colored derivatives analogous to those of aniline. A greater importance was given to this research, seeing the high degree of condensation of these substances, which naturally led me to expect greater stability in the compounds. I first gave my attention to producing these two substances easily and cheaply; first, nitronaphthaline, and then naphthylamine.

Preparation of Nitronaphthaline.—Into a globe of 8 litres capacity introduce 1 kilogramme of ordinary naphthaline, and 6 kilogrammes of commercial nitric acid, and dispose the apparatus over a bath of boiling water. The naphthaline first melts and floats on the surface. Shake the globe briskly from time to time. Some red vapors will be disengaged, and the oily layer will sink gradually to the bottom. The operation is then over. Hasten to decant the floating acid, and pour the oily matter into an earthen pan, where it will quickly congeal. At the moment of solidifying, constantly shake it, and wash it several times to carry off the excess of acid. To purify the nitronaphthaline it is sufficient to melt it, and to compress it strongly when cold. Melted nitronaphthaline can be filtered through paper, which it traverses as easily as water. Solid nitronaphthaline is of a reddish color; but the powder has a beautiful yellow tint. Nitronaphthaline, which has been sufficiently compressed so as to free it from a red oil which impregnates the mass, is very pure. Almost the theoretical quantity is obtained. The acid mother-water of this preparation contains various products, and especially white binitronaphthaline, which often crystallizes on cooling. The mother-waters retain a large quantity of nitric acid, colored yellow, and capable of being utilized.

Preparation of Naphthylamine.—Introduce into a balloon six parts of commercial hydrochloric acid, one part of nitronaphthaline prepared by the above process, and to this add a quantity of granulated tin, so as to reach the top of the mixture. The balloon should not be more than half full. Place the apparatus in a water-bath, and shake it from time to time. In a

few seconds an energetic reaction takes place; the nitronaphthaline disappears, and the liquid becomes limpid, though of a brown color. Decant the liquid into a sandstone vessel, containing a mixture of two litres of commercial hydrochloric acid, and one litre of water, where the crystallization of the hydrochlorate of naphthylamine soon solidifies the whole. When quite cold put it to drain on a coarse linen, and then forcibly compress it. To purify this salt it is sufficient to dry it thoroughly, to dissolve it in boiling water, to add sulphide of sodium to precipitate the tin, and to filter the liquid through wet paper, which retains a tar-like matter. The hydrochlorate of naphthaline crystallizes by cooling. Strain, compress, and then heat it in a stove to $+100^{\circ}$.

Hydrochlorate of naphthylamine easily sublimes like benzoic acid or sal ammoniac. It is then very light, and in brilliant white flakes of great purity.

The mother-water of the last crystallization of hydrochlorate of naphthylamine will serve for the preparation of naphthylamine itself, or it may be otherwise utilized.

The preparation of these various products by these processes is so simple, that one day only is required to obtain several kilogrammes of hydrochlorate of naphthylamine, beginning with the naphthaline itself.

Among various trials I have made of naphthylamine for dying purposes, the two following will give the best idea of the important part which these products may be made to play:

Mix two limpid and colorless solutions, one of hydrochlorate of naphthylamine, the other of nitrite of potash, and a beautiful red precipitate is produced, insoluble in water. The application of this reaction to dying purposes is extremely simple. It is only necessary to plunge the specimens of silk or wool into a solution of hydrochlorate of naphthylamine, heated to $+50^{\circ}$, to wring them out, to get rid of the excess of liquid, and to plunge them into a cold and weak solution of nitrite of potash. Then wash them in plenty of water, and put them into alkaline water. According to the concentration of the liquids and their degree of acidity the shades of color obtainable vary from a rose-color to a deep-red chestnut. The chief character-

istic of this coloring matter is its fixity. It is unalterable by exposure to light, unattackable by decolorizing chlorides, sulphurous acid, alkaline solutions, and acid liquids. The strong concentrated acids turn this color to violet, whilst the stuff itself remains impregnated with acid. The tint is restored in all its integrity, by simply washing in water. This color, by its exceptional stability, reminds us of alizarine. It is sure to be quickly appreciated by dyers.

When rough hydrochlorate of naphthylamine, which contains perchloride of tin, is heated in an oil bath to about $+230^{\circ}$ to $+250^{\circ}$, there remains in the retort, besides a large proportion of sublimed organic salt, a brilliant blackish mass.

This matter should be finely powdered, and treated several times with boiling water, to take away all soluble portions. After drying, treat it with boiling alcohol, which almost completely dissolves it, meanwhile developing an intense red-violet color. When applied to stuffs, this color is unaffected by the sun, acids, or alkalies. I hasten to make these results public, and intend to continue my investigations.—*London Chem. News, Dec. 13th, 1862, from Comptes Rendus.*

ON OAKUM AS A SUBSTITUTE FOR LINT.

By DR. RUSCHENBERGER, U. S. N.

[Dr. R. after recapitulating the chief points of Dr. Sayre's paper, at page 411 of our September number, remarks as follows.—Ed.]

It may be fairly inferred that, in the opinion of Dr. Sayres lint possesses the same degree of capillary force, as cotton, either free or strongly compressed in a bale, and that oakum has much greater capillary power than either cotton or lint, and for this reason he suggests that oakum should be substituted in the place of lint, not in all cases or under all circumstances, but only in gunshot and other suppurating wounds.

Some may ask, what is oakum?

Hemp is spun first into yarns which are imbued with about fifteen per cent. of tar, at a high temperature, and then these yarns are laid or twisted into rope. The tar is applied for the

purpose of diminishing as far as possible the capillary force of the rope, and, by thus excluding the moisture to which it is constantly exposed, of retarding its decay. But in spite of the presence of the tar, rope is found to lose its tenacity or strength in the course of from one to ten years, according to the uses to which it may be applied, and being no longer serviceable as a rope, it is cut up, and shredded and converted into oakum which is used for caulking or filling all seams or joints in ships, for the purpose of excluding moisture.

Tow is the refuse or scrapings of hemp or flax.

In order to obtain an idea of the comparative absorbent power or capillary force of oakum, cotton, lint, and tow, small parcels of these articles, of ascertained weight and dimensions, were gently placed on the surface of the water in a basin, and carefully weighed again after removal. The weight of water absorbed by each, thus ascertained, is stated in the following table :

	Weight.	Dimensions.	Time in contact with water.	Weight of water absorbed.
Cotton (wool) . .	40 grs.	3 in. diam.	1 hour 10 m.	8 grs. = 1.5 "
Oakum	"	$2\frac{1}{2}$ "	do. do.	10 " = $\frac{1}{4}$ "
Tow (from hemp) . .	"	$2\frac{1}{2}$ "	do. do.	250 " = 6.25 tms.
Coarse Lint (shoddy) . .	"	$2\frac{1}{2}$ "	1 minute	280 " = 7 "
Scraped Lint	"	$2\frac{1}{2}$ "	instantly	298 " = 7.45 "
Patent Lint	"	$1\frac{1}{2}$ by 3 in.	4 minutes	289 " = 7.47 "

Forty grains of cotton submerged and slightly squeezed under water for a few seconds, was found to retain without dripping. 270 grains; and an equal weight of oakum treated in the same manner, only 94 grains of water. The oakum retained little more than twice its weight, and the cotton nearly seven times its weight of water.

The inference from these experiments is that the capillary force of patent lint is nearly thirty times, and that of tow twenty-five times greater than oakum: and the capillary force of oakum is only one fifth greater than that of cotton. Oakum absorbed one-fourth, and cotton one-fifth of its weight: but tow 6.25 times, coarse lint 7 times, scraped lint 7.45 times, and patent lint 7.47 times its weight of water.

If the property of capillary force alone is to determine the

choice of tissue or substance for covering suppurating wounds, any description of lint or tow is to be preferred to oakum.

Tow has been long employed as an outside dressing or recipient of profuse discharges; and also as a swab in cleansing offensive suppurating wounds, where sponge was not sufficiently abundant to be expended in this way. The objection to tow is, that there are apt to be sharp or hard spiculæ adhering amongst its fibres, which give pain when brought against a sensitive surface; but this objection may be obviated by carefully selecting and carding the substance. A better substitute for sponge for cleansing purposes in surgery is cotton wool, which, saturated with soap suds, or simply with tepid water, and held in a dressing forceps, forms an admirably soft application that may be used where the finest sponge would be found by the patient rough and harsh. Indeed, considerations of cleanliness and of avoiding the diffusion of morbid matters from patient to patient, suggest that sponge used once as a detergent implement should not be used in the case of any other individual, and not too often on the same person. Cotton or tow forms a detergent implement so cheap, that it may be renewed at every dressing, and ought to be substituted for sponge without any reference to cost, for cleansing purposes.

It is said that cotton or lint placed over a suppurating wound serves to *prevent* the escape of pus, and that oakum should be substituted. But, it seems that oakum as well as lint may block the way and hinder the flow of the escaping liquids, if not removed when saturated. Then why should a copiously discharging wound be enveloped in any capillary material; why not permit the discharge to flow without impediment of any kind? Any contrivance which would keep the wounded part at a normal temperature, whether in the form of oiled silk, or other tissue not readily permeated by moisture, or in shape of a simple veil or shield from flies in hot weather, might prove more salutary than the effects of a bunch or pledget of wiry oakum secured over it by bandage or otherwise.

Supposing that oakum possesses all the qualities claimed for it in the instances specified, it cannot be regarded as a substitute for patent lint, because there is often necessity for just

such a pliant tissue to serve as the vehicle in the application of ointments to morbid surfaces—such as blisters, for example.

Substitutes are almost always defective expedients. Whether they are adopted for parsimony, poverty or other reason, they rarely satisfy the requirements they are employed to meet. The workman who uses implements in all respects adapted to his vocation produces more perfect results than he who labors with a paucity of tools, and hence, driven to expedients, is compelled to require from his awl the work of a gimlet.

Oakum is, doubtless, applicable as a substitute to some ends. It may answer as an external dressing, a mere recipient of liquid discharges; but for such purpose, as it costs much more and has less capillarity, it is a poor substitute for tow. Its application to the uses to which patent lint is especially adapted could be suggested only where no soft tissue is procurable. Canton flannel would answer the place of patent lint better than oakum; but comparing their adaptability to the object in view, the propriety of substituting Canton flannel, at thirty-five cents the square yard, for patent lint, while this is procurable at forty cents, does not commend itself to notice.—*Lond. Pharm. Journ.*

ON THE OCCURRENCE OF SILICA IN THE HIGHER PLANTS.

The existence of considerable quantities of silica in the bamboo, in the equisetums, in the grasses and sedges, has long been known.

The numerous analyses of the ashes of plants which we now possess, indicate that this substance is an invariable ingredient of the higher plants when they grow in natural soils. We find it in fact in nearly all parts of agricultural and forest plants. The seeds of the bean, quince, lemon, madder and flax are among the few parts of plants in which it has not been detected.

In the ash of the *wood* of most common forest trees, it ranges from 1 to 3 per cent; in the *Carpinus betul* it is as high as 4.97 per cent, (Fr. Schulze); in the *Pinus sylvestris*, 8.39 per cent, (Levi); in the *Pinus picea*, 20.01 per cent, (Hertwig.)

In the ash of *leaves* silica is more abundant than in that of wood. The ash of turnip leaves contains 3 to 10 per cent, (Anderson); of *Pinus picea*, 10.79 per cent, (Fr. Schulze); of

the hop, 12.14 per cent, (Nesbit); of tobacco, in one case, 17.65 per cent, (Fresenius and Will); of the beech, *Fagus sylvatica*, 26.7, and the Oak 30.94 per cent, (Henrici). The ash of oat leaves contains 11.42 per cent, (Arendt), 16.58 per cent, (Norton).

In the *bark*, *rind* or *cuticle* of plants, silica appears to be most abundant. In the ash of the bark of the beech there is 17.97 per cent, (Wilhelmi), in *Prunus avium* 21.3 per cent, (Hoffmann). The most remarkable dicotyledonous plant in this respect is the *Hirtella silicea* or Cauto tree of South America. Henrici found in the bark of this tree 34.4 per cent of ash of which 96.17 per cent was silica. The bark is very firm, harsh and difficult to cut, like a soft sandstone. Crüger states its ashes are used by the natives of Trinidad to mix with clay for making earthen vessels.

In the ash of the rind of the bamboo there is 70 per cent; in that of the *Chamerops excelsa* 90 per cent; in the ash of the *Equisetum hyemale* 97.52 per cent of silica, (Struve). In the bamboo we have, so to speak, silicious calculi—the Tabashir.

As to the *condition* of the silica in the plant, Arendt has shown that in the oat plant it is to a great degree insoluble (see table below), and his investigations of the oat in different stages of growth, further show that silica when once deposited in the tissues, suffers no subsequent change of place, as happens with other ingredients.

The *position* of silica in the plant is seen, from the percentages above quoted, to be, in general, at the surface. Although it is found in all parts of the plant, yet the *cuticle* is usually richest, and this is especially true in cases where the content of silica is large. Davy in 1799 drew attention to the deposition of silica in the cuticle, and announced the idea that it serves the plant an office of support similar to that enacted in animals by the bones.

The silica assumes the form of the cells in the cuticle of the *Equisetums* and *Deutzias*, is well known. Kindt finds that the hairs of nettles, Wicke that the hairs of hemp, hops and other rough-leaved plants are incrustated with silica. According to Wicke the leaves of many forest and fruit trees when cautiously incinerated, leave a silicious skeleton that preserves the form of the epidermis. Mohl has minutely studied the position assumed

by silica in many plants. He finds that in some leaves, only the upper; in others, both sides contain silica in the epidermal cells. In some the hairs alone, in others the hairs and epidermal cells also, are incrustated with this body. In *Deutzia* and *Ficus elastica* the vascular tissue is incrustated with silica. Wicke, found that the bark of the beech and maple, *Acer pseudoplatanus* are coated with silica. This is especially true of the beech which is literally enveloped in a silicious shirt of mail, whence the smooth and undecayed surface which its trunk presents. From the inner bark—bast-fibre—of flax, Wicke obtained after destruction of the organic matter, well characterized elongated cell-skeletons of silica. In the ashes of old linen he found 23 per cent of this substance. In the fibers of Manilla hemp, *Musa textilis*, Aloe hemp, *Agave Americana*, New Zealand flax, *Phormium tenax*, all tenacious textile materials, Wicke found as in flax the entire cells incrustated with silica. In cotton fibre it is wanting. In jute, *Corchorus textilis*, some cells are partially incrustated. Wicke concludes that the durability of textile fibres is to a degree dependent on their content of silica.

The function of silica appears to be, in cases of the grasses, sedges and equisetums, to give rigidity to the slender stems of these plants, and enable them to sustain the often heavy weight of the fruit. Two circumstances, however, embarrass the unqualified acceptance of this notion. The first is, that the proportion of silica is not greatest in those parts of the plant which would most appear to require its presence. Thus Norton (this Journal, [2,] vol. iii. pp. 235-6) found that in the sandy oat the upper half of the dry leaf yielded 16.22 per cent ash, while the lower half gave but 13.66 per cent. The ash of the upper part contained 52.13 per cent of silica, while that from the bottom part had but 47.79 per cent of this ingredient. According to Arendt (*Das Wachstum der Haferpflanze*, p. 180) the different parts of the oat contain the following quantities of silica respectively:

Amount of silica in 1000 parts of dry substance.	Removed by water.	Insoluble in water.	Total.
Lower part of the stem,	0.33	1.41	1.74
Middle part of the stem,	0.30	4.82	5.12
Upper part of the stem,	0.36	13.02	13.38
Lower leaves,	0.86	34.37	35.23
Upper leaves,	0.52	43.35	43.87

We see then plainly that the upper part of the stem and leaves contain more silica than the lower parts, while the lower parts certainly need to possess the greatest degree of strength.

In the second place the great variableness observed in the same plant, and in the same part of the plant, as to the content of silica, would seem to indicate that this substance is to some degree accidental.

In the ashes of ten kinds of tobacco leaves, Fresenius and Will found silica to range from 5.14 to 18.39 per cent.

The analysis of the ash of 13 samples of pea-straw, grown on different soils from the same seed during the same year, under direction of the "Landes Economie Collegium" of Prussia, gave the following percentages of silica, viz: 0.56; 0.75; 2.30; 2.32; 2.80; 3.29; 3.57; 5.15; 5.82; 8.03; 8.32; 9.77; 21.35. Analyses of the ash of 9 samples of colza-straw, all produced from the same seed on different soils, gave the following percentages: 1.00; 1.14; 3.02; 3.57; 4.65; 5.08; 7.81; 11.88; 17.12.—*Journal für prakt. Chem.*, xlviii. 474-7.

Such instances might be greatly multiplied, and they have conducted to the opinion that a part of the silica is accidental, a notion further sustained by the fact observed by Saussure,* the earliest investigator of the composition of the ash of plants (*Recherches sur la Végétation*, p. 282), that plants raised on a silicious soil are in general richer in silica than those grown on a calcareous soil. Norton found in the chaff of the Hopeton oat from a light loam 56.7 per cent, from a poor peat soil 50.0 of silica, while the chaff of the potato-oat from a sandy soil gave 70.9 per cent.

Knop has recently published an account of the production of a maize plant that yielded 140 ripe seeds, and had a dry weight of 50 grms. in a medium so free from silica that a mere trace of this substance could be found in the root, but half a milligramme in the stem, and 22 milligrammes in the 15 leaves and sheaths. It was altogether absent from the seeds.

The ash of the leaves of this plant thus contained but 0.54 per cent of silica, and the stem but 0.07 per cent. Way and Ogston found in the ash of maize, leaf and stem together, 27.98 per cent of silica.

Knop is inclined to believe that the little silica he found in

his maize plant was due to dust, and did not belong to the tissues of the plant. He remarks, "I believe that silica is not to be classed among the nutritive elements of the gramineæ, since I have made similar observations in the analysis of the ashes of barley."

Knop does not inform us as to the firmness of the stem of this plant. It would seem, however, that while silica is not essential to the nutritive process in vegetation—is not required for the perfect elaboration of all the cells and organs of the plant—it is useful or even needful to consolidate the tissues, and thus to insure the vegetable structure against mechanical injury. The fact of its presence in variable amount and its most abundant occurrence in the upper and outer parts of the vegetable structure would indicate that the plants which contain it in large quantity oppose in their root surface no obstacle to its entrance, and that within the plant it obeys to a great extent the ordinary laws of diffusion, until it is made insoluble by losing the colloid and assuming the crystalloid condition; or until it is arrested by the plant-tissues in a manner similar to that by which fabrics of dead cellulose attach to their surfaces the ingredients of mordants and dyes; or, finally, until it is left in the cuticular cells as a simple residue of the evaporation of the water that is perpetually steaming from the soil through the plant into the atmosphere.—S. W. J. *Am. Journ. Science and Arts*, Jan. 1863.

DISCOVERY OF ANTIMONY IN NEW BRUNSWICK.

(Extract of a letter to Prof. SILLIMAN, Jr., dated University of New Brunswick, Fredericton, Dec. 9th, 1862.)

My dear Sir:—In answer to your enquiries with regard to the deposits of antimony recently discovered in this Province. I take pleasure in sending to you the following remarks upon the principal locality, kindly furnished to me by Mr. Edward Allison, the present owner of the district where the vein occurs. I repeat the description in Mr. Allison's own words:

"The lode of antimony, recently discovered, occurs in the Parish of Prince William, about 20 miles above Fredericton, on the S. W. side of the St. John River. From the river the

rise is gradual till it reaches the summit of the water shed, say from 300 to 400 ft., when the ground falls away towards Lake George and the Pokiok River. The soil of this slope is good agricultural ground, and free from rocks, but near the summit a band of primary rocks protrudes through the soil, as is shown particularly where it intersects the highway. This band of rock contains the lode of antimony referred to; its course is nearly N. E. and S. W. It was discovered in loose boulder rocks which had evidently been detached from this projecting ridge, and upon uncovering the rock, the antimony was discovered imbedded in it. This lode we have traced about one-fourth of a mile by trial pits in this line. The rock is uncovered only in a few places, and lies from 2 to 6 ft. beneath the soil. For the above distance we have found the lode to be associated with the rock, and it probably extends farther.

The lode when uncovered appears to be about 2 ft. wide, with a dip of say 45° to the N. In no case has the vein been penetrated more than 6 ft., and in most places merely uncovered to prove its continuation, therefore I can only describe it as it appears under this partial development.

Samples of this ore have been analyzed by Drs. Hayes and Jackson of Boston, and also in England. The results differ considerably, owing no doubt to the difference in the quality of the samples.

The specimen sent to Dr. Hayes was very inferior, carrying with it a considerable portion of the gangue, which was principally quartz with some carbonate of lime. Dr. Hayes' results were 36 pr. ct. of ore. Dr. Jackson's analysis I have not seen, but understand that he returns 73 pr. ct. of metal. This no doubt arises from specimens being carefully selected, and would not show a fair average of the ore. Messrs. Hayes and Jackson return *silver* as a component. The samples sent to England were very inferior, giving a result for antimony rather less than that shown by Dr. Hayes, but including from 3 or 4 to 12 oz. per ton for silver.

I would say that the mine has not been fairly opened, consequently a current opinion of this deposit can scarcely be given, but from appearances already developed I think it promises a large yield of antimony, and possibly more valuable products

may be found in connection with it. About a ton of the ore has been shipped to Liverpool to be operated upon, and we hope that the results will prove satisfactory." * * * *

To the foregoing account of Mr. Allison's, I have only to add, that in the specimens which I have seen, the antimony, which exists in the state of a sulphuret, penetrates the quartz gangue in irregular veins, with little if any crystalline structure. It is quite brilliant when fresh, but quickly tarnishes upon exposure, becoming of a dull grayish-black color.

Antimony has also been found within three miles of the city of Fredericton, close by the river bank, but only in small detached pieces. These, however, indicate the near presence of another vein, whose exact site has not been ascertained. The ground being now clothed with several feet of snow, no further enquiries can be prosecuted during the present season. These specimens are much more highly crystallized than those of Mr. Allison.

I would also say that a specimen of bismuth, said to be from the Province, has been shown me recently, but the facts of its occurrence have not yet been definitely ascertained.

I am very truly yours,

L. W. BAILEY.

Am. Journ. Science and Arts, Jan. 1863.

CARBAZOTATE OF IRON.

Mr. H. N. Draper gives (*Dublin Med. Press*, Dec. 3, 1862) an interesting account of this new preparation of iron. The following are the more important points:

The mode of preparing it is as follows: Crystals of pure carbazotic acid are digested with an excess of recently precipitated sesquioxide of iron and water at a gentle heat until the acid has disappeared. The whole is then transferred to a paper filter, and when the deep yellow solution of carbazotate has passed through, the residue on the filter is to be washed with hot water until the filtrate becomes colorless or nearly so. The washings being added to the original solution, the whole is evaporated to dryness at a temperature not exceeding 212° .

Physical Characters.—Thus prepared, carbazotate of iron presents the appearance of a reddish-brown amorphous mass,

which, when reduced to powder, becomes lighter in color. Its taste is astringent and intensely and persistently bitter.

The chemical constitution of the salt, Mr. D. thinks, is three equivalents of carbazotic acid ($C_{12}N_3H_3O_{14}$) united to one of sesquioxide of iron.

Physiological Action and Therapeutic Use.—Carbazotic acid and its salts appear to possess very decided tonic and anti-periodic properties, and will most probably prove, on more extended trial, valuable and economical substitutes for quinine. In large doses the acid is poisonous; according to Taylor,* ten grains have sufficed to kill a dog in less than two hours.

In the hands of Drs. Calvert and Moffat,† the carbazotate of iron has proved very successful in the cure of cephalalgia; the same authors have also employed with good effect the ammonia salt in the treatment of anæmia, intermittent fever, and hypochondriasis, and combined with opium and gallic acid in obstinate diarrhœa. They observe that while the acid itself is liable to produce cramps, its compounds with bases are free from this objection. The dose of the salts employed by these experimentalists was from .05 to .10 gramme ($\frac{3}{4}$ to $1\frac{1}{2}$ grain) per diem.

More recently, Mr. Alfred Aspland,‡ of the Ashton Royal Infirmary, has, at the request of Dr. Calvert, tried carbazotic acid and its salts on a more extensive scale, and with a success which should encourage further experiment. Mr. Aspland treated forty severe cases of ague, giving the acid in doses of a grain three times a day, gradually increased to four grains at each dose. Some of the patients were relieved in forty-eight hours, while in two cases the treatment had to be continued for nine weeks. Mr. Aspland has also employed the acid with good results in diabetes, in anæmia and prostration from loss of blood in infantile marasmus, in rickets, and as a tonic in cases of debility, and where quinine is usually given; also in dyspepsia and hypochondriasis. He states himself as unable to decide whether the salts of carbazotic acid, or the acid itself acts better, and does not allude to any inconvenience resulting

* On Poisons, p. 793.

† Pharm. Journ., vol. xvi. p. 167.

‡ Med. Times and Gazette, vol. ii. 1862, p. 289.

from the use of either beyond the peculiar coloration of the skin always attending the continued use of this remedy.

The iron salt will probably be found from its ready solubility one of the best forms of administering carbazotic acid, and especially suitable as a substitute for the combination of quinine with ferric salts. It should, on account of its intensely bitter taste, be administered in the form of pills.

A most remarkable result produced by the continued exhibition of this acid and its salts is that the skin and conjunctivæ of the eyes become dyed of a deep yellow hue, and the urine acquires an orange color. This effect is, according to Drs. Calvert and Moffat, generally brought about in a time varying from two to sixteen days after the commencement of the treatment, or when about fifteen grains of the acid have been taken, and they are inclined to attribute the failure of Braconnot in producing this coloration, to the fact that he employed the potash salt, which is almost insoluble. Mr. Aspland, whose experiments have been cited above, finds that the skin becomes most easily tinged in robust subjects, and more in adults than in children. The urine, on the other hand, is more colored in these cases. The skin in the best dyed cases, clears in two or three weeks after the remedy has been discontinued.

Dose.—From half a grain to two grains, gradually increased."—*Amer. Jour. Med. Sci. Jan. 1862.*

SYRUP OF CARBONATE OF IRON.

Mr. H. N. Draper gives (*Dublin Med. Press*, Dec. 3, 1862) the following formula for the preparation of this, which he considers a great improvement upon the usual form.

“Carbonate of iron readily dissolves in simple syrup, and as the sugar exercises a completely conservative influence upon the salt, this is one of the best forms in which it can be exhibited :—

Protosulphate of iron	. . . . .	2 ounces.
Carbonate of soda in crystals	. . . . .	2½ “
Water	. . . . .	2 pints.
Sugar	. . . . .	4 ounces.

Dissolve the sulphate of iron and half the sugar in one pint, and the carbonate of soda and the remainder of the sugar in the other pint of water, mix the solutions, allow the precipitate to subside, and decant the supernatant fluid. Then rapidly wash the precipitate by decantation, using for washing the whole of the following solution, but dividing it between two operations:—

Sugar	.	.	.	.	.	5 ounces.
Water	.	.	.	.	.	20 "

Next digest the washed precipitate in a sufficient quantity of sugar solution of like strength, agitating it repeatedly during some days. When it is all dissolved, add

Sugar	.	.	.	.	38½ ounces.
Water	.	.	.	.	19 fluidounces.

Boil to a specific gravity of 1.265 (at boiling point) and flavor with tincture of lemon or orange peel. This syrup contains about ten per cent. of carbonate of iron, is nearly colorless, and without unpleasant taste.

Dose.—One fluidrachm."—*Amer. Jour. Med. Sci. Jan. 1862.*

ON CANTHARIS.

BY FRANKLIN C. HILL.

Several species of *Cantharis* found in the United States, as *C. vittata*, *C. atrata* and *C. cinerea* are known to be at least equally powerful with *C. vesicatoria*. It is even asserted that they are so much more powerful as to be dangerous, though this is doubtful, the fact probably being that they have been used in a fresher state than that in which the foreign article can be obtained, and, possibly, unskillfully exhibited.

The number of species of this and the allied genera *Meloe*, *Mylabris*, &c., distributed over our territory, is very great, but I have failed to find the author, excepting the late Doctor Harris, who has thought their habits and properties worthy of notice, and his observations were necessarily confined to the species of New England.

Audoin has left us (*Ann. des Scien. Nat. t. ix.*) an invaluable history, commercial, therapeutic, anatomical and social, of the

C. vesicatoria, but as yet we have no naturalist equal to the same labor of love for our native species.

Agassiz complains that our young naturalists study structure and classification to the exclusion of equally valuable branches, and warns them of the injury they are doing to science by it; and Emerson sneers, not without reason, at modern botany, as consisting wholly of Latin names; he might have said, bad Latin.

Since accepting the task assigned me, I have found my time too fully occupied with other matters, to make original observations of any value. In fact but one species, *C. atrata*, has come under my observation at all.

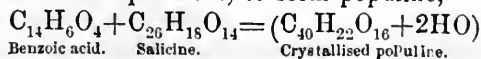
These may be found at this season in considerable numbers on the blossoms of the solidagos, or on the China asters, which they infest and destroy. From observations made on the species last summer, I should judge that the amatory process, so graphically described by Audoin, is generic, at least the initiatory performances, which were all I saw, were the same.

Commercially the subject is not worth consideration. On the prairies of Illinois I have often held four species in my hand at once, but all that I saw in the West would not amount to more than a few ounces weight, and, were they as plenty as mosquitos, when harvest hands are paid two dollars a day, no collector could compete with the foreign article at present prices.—*From Proc. Am. Pharm. Assoc.* 1862.

ON THE ARTIFICIAL FORMATION OF POPULINE, AND ON A NEW CLASS OF ORGANIC COMPOUNDS.*

BY DR. T. L. PHIPSON, F. C. S., &c.

The interesting substance, populine, was extracted in 1830, by Braconnot, from the mother-liquors which had deposited salicine, when the latter was obtained from the leaves of the poplar tree, *Populus tremula*. In 1852 Piria showed that in a variety of circumstances populine split up into benzoic acid and salicine. Dr. Phipson shows that salicine and benzoic acid combine, equivalent for equivalent, to form populine,—



* Read before the British Association.

This occurs when the two substances are dissolved together in alcohol, and the solution made to crystallise; the properties of the artificial compound being precisely identical with those of the natural product. Its peculiar taste—acid and sweet at the same time, reminding us of the taste of liquorice—is characteristic. With sulphuric acid it takes a red color, and with bichromate of potash and sulphuric acid it gives, on heating, salicylic acid. In this combination salicine has lost its bitter taste, which renders it probable that populine is a compound of benzoic acid, sugar, and saligenine; for, when boiled with dilute sulphuric acid, it breaks up into benzoic acid, sugar, and saliretine (saligenine *minus* aqua). The molecule of populine is, therefore, a very complex one; and these kinds of compounds may perhaps be compared to the combinations of two or more salts in mineral chemistry,—for instance, to alum, if we compare the sulphate of alumina to the benzoic acid, the sulphate of potash to the saligenine, and the twenty-four equivalents of water to the sugar.

The author goes on to state that he has obtained similar compounds with tartaric and citric acids. He states that when these two acids are taken in equivalent proportions, dissolved in water, and quietly evaporated, they enter into chemical combination. It is well known that these acids crystallise in two different systems, the forms of which are incompatible; and by evaporating a mixture of them, we should obtain two kinds of crystals if no combination took place; but the author finds that they do not combine, and produce one kind of crystal only,—namely, long, prismatic needles, and when one of these needles is taken and analysed, it is found composed of citric and tartaric acids.

“This combination of citric and tartaric acids,” says Dr. Phipson, “is probably only one example of a new class of organic compounds, similar in some respects to populine, which remains to be studied. Already Professor Williamson has shown that the different acetones may be made to combine so as to produce complex acetones. Thus, when valerate and acetate of lime are distilled together in equivalent proportions, we obtain aceto-valerone,—a compound of acetone and valerone, and so on for the others. It is highly probable that other organic

acids, besides benzoic acid, may be made to combine with salicine; likewise, that other bitter principles analogous to salicine may be combined with organic acids to produce substances similar to populine."—*Lond. Chem. News*, December 6, 1862.

ATROPIA PAPER.

This paper is recommended by Mr. Streatfield, "Ophthalmic Hospital Review," as a portable and convenient substitute for the solution of atropia in ordinary use. It consists of green tissue paper, imbued with a solution of the sulphate of atropia, so that a piece one-fifth of an inch square is equal to or contains as much of the salt as a drop, or minim, of the solution of a strength in ordinary use, two grains to the ounce. The paper, soaked in the strong solution, is hung up to dry, and turned about while drying, that the atropia may be equally distributed. The little piece of the paper to be used, of the size above indicated, is taken up on the tip of the forefinger, previously damped; and the patient's lower lid being drawn down, he is told to look upwards, and the scrap of paper is put on the sclerotic conjunction below the cornea almost without the knowledge of the patient; the lid is then let go, and the piece of paper is left between the ocular and palpebral conjunction; a handkerchief is then tied over the eye, that the lids may be closed for a while.—*London Phar. Jour.* January, 1863.

ON AMERICAN TARTAR.

By W. J. M. GORDON, OF CINCINNATI, OHIO.

At the last meeting, the following question was submitted to me, "What are the probabilities in favor of tartaric acid and tartar becoming commercial products of the Ohio Valley?" There has been no attention given to the deposit of tartar by the wine growers in the Ohio Valley up to the present time, although to judge of representations of those who have wine cellars, a large amount of tartar could be collected. I have determined, as soon as I can ascertain the average value of the tartar produced here, to offer to purchase all that I can obtain; by this means, no

doubt, I shall soon arrive at a definite conclusion, and should it be thought worth while to continue this subject to me, I can at another meeting answer it with some certainty. With this you will find a letter I received from the President of the Wine Growers' Association, under date of April 12th, 1862, which contains some matter of interest.

"Mr. Wm. J. M. Gordon:—

Dear Sir,—Your first communication on the subject of Cream of Tartar produced in the Ohio Valley, addressed to me as the President of the "American Wine Growers' Association," was laid before the Association at the last meeting, and information elicited from the members present. They concurred in the reply that no attention has been paid by wine growers to the manufacture of tartar, or the collection of the crude tartar deposited in their casks.

The customary mode has been, when changing wine from one cask to another, to clean the casks, and no care has been taken of the dregs, or what they considered the useless deposit of tartar in the casks.

We cultivate in Hamilton county about 4,000 acres of grapes. The product of small vineyards are generally sold to dealers in wine the first year after pressing, consequently but a small quantity of tartaric acid would accumulate in the casks. The manufacturers of champagne wine use large quantities of one and two years' old wine, which is taken from the casks and put into bottles; of course this would prevent the accumulation of tartar. The only plan of calling the attention of the wine grower to this subject is to have some authorized person to offer a certain price for the crude tartar, thus by showing the wine grower or wine dealer that some profit may be derived by saving the tartar and the refuse of his wine casks, they might then be induced to collect and save what is now considered useless.

The principal wine growers in this county, and those who have large casks in their wine cellars, are: Longworth, Bogen, Yeatman, Werk, Mosher, Mottier, Duhme, Williamson, Hodge, and others, who might find it to their advantage to save the tartar of their casks, and thus establish a nucleus for enlarging the collection of larger quantities, until some one would be induced to manufacture the cream of tartar sold in the shops.

I believe that this subject is worthy of the attention of the wine growers of the Ohio Valley, and that any mode proposed, by which the wine dealer could see a profit derived from his labor, in saving that which is now thrown away, that he would of course assist in promoting the manufacture of cream of tartar, thus releasing us from a dependence on the wine districts of Europe for this article of commerce.

The destruction of the grapes of this region this season, by the mildew and rot, has discouraged our wine growers, and it is an unpropitious time to suggest experiments, or to undertake any expensive improvements connected with the cultivation of the grape.

I am, very respectfully your obedient servant,

GEO. GRAHAM,

President of the American Wine Growers' Association.

—*From Proc. Am. Pharm. Assoc.* 1862.

RESEARCHES ON HENNA.

BY M. ABD-EL-AZIZ HERRAONY, OF CAIRO, EGYPT.

The author, a graduate of the School of Pharmacy of Paris, selected Henna as the subject of his thesis. Henna (*Lawsonia inermis*) is a plant known to the people of the East from the highest antiquity. The leaves are employed either as a medicine or in the preparation of certain cosmetics. Its flowers, possessing equal medicinal virtue, are used as an agreeable perfume. They are sold in Cairo, as the lilac is in Paris.

Henna is common in the East Indies at Malabar, Ceylon &c., and in Arabia, Persia, and Egypt, where it is very abundant. The author admits of only one species—*Lawsonia alba*, of which there are two varieties, *L. inermis* and *L. spinosa*. The leaves are employed as a topical application to ulcers of the mouth, and for staining the feet, hands, and hair. This use is perhaps less the result of coquetry, than to avoid certain skin diseases so common in hot countries. The leaves are also used for dyeing light-colored woods of a mahogany color. The fruit is considered emenagogue.

Henna is furnished to commerce in the form of powder. Two

sorts are distinguished ; *Henna of Arabia*, and *Henna of Egypt*, the latter least esteemed. The former is often adulterated with sand and Egyptian henna, so as to be about equal in dyeing value to the latter.

The author in his chemical examination has aimed at isolating the active coloring principle. Cold water does not extract it, but it is removed by boiling water. Ether does not remove it, but extracts the chlorophylle. Alcohol of 90 per cent. completely extracts it by percolation ; and when the alcohol is distilled off from the tincture, the syrupy residue exhausted by ether, and the residue again treated by strong alcohol, and evaporated, the active matter is obtained.

This principle is brown, of a resinoid appearance, and soluble in boiling water. It possesses the properties of tannin, such as blackening the sesqui-salts of iron and precipitating gelatin. It reduces oxide of copper in Trommer's test, and heat decomposes it with the evolution of crystalline needles, which reduce nitrate of silver. The coloring matter of henna is therefore a species of tannin, and the author has named it *henno-tannic acid*.

The author made various experiments with henna as a dye stuff, for silk and woolen, with results favorable to the permanence of the shades of color produced.—*Jour. de Pharmacie*, Jan. 1863.

ON A NEW METHOD FOR DETERMINING THE NATURE OF A MIXTURE OF COLORING PRINCIPLES.

BY M. LE DOCTEUR FREDERICH GOPPELS-RÆDER.

Professor at the University of Basle.

Some time ago M. Schönbein presented to the Société des Sciences Naturelles of Basle some very interesting observations on the different heights to which divers bodies held in solution rise by imbibition in the pores of blotting paper.

In these facts the author finds the key to a new method of analysis, and, in conjunction with M. Schönbein, has investigated the behavior of coloring matter from this point of view.

Pieric acid is remarkable for the facility with which it enters the pores of the paper, and this property distinguishes it when mixed with other coloring matters possessing less power of infil-

tration. Thus, a mixture of picric acid and turmeric in aqueous solution is determined with great ease by the partial immersion of a strip of porous paper. Above the point of immersion three bands will be observable,—the topmost very narrow, containing water only; the central broad, and colored by picric acid; the lowest one also yellow, but deriving its tint from the turmeric. In fact, when the paper is plunged into a potash solution the middle band of picric acid disappears, while the lower one takes a brown tint. It is obvious that the separation is not complete, the lower bands always containing more or less of the principles which have mounted to the upper bands.

A mixture of aqueous solution of picric acid with a very dark solution of sulphate of indigo, producing a beautiful green color, gives on the paper sometimes three, sometimes four bands.

If the liquid is of a free green color, four bands are obtained, namely, the lowest broad and green, next above a narrower yellow band, the third colorless, containing sulphuric acid, as can be proved by a drop of litmus tincture; and lastly, a band of pure water, which is absent if the sulphate of indigo is in excess, for in this case the presence of too large a proportion of acid prevents the separation of the water and acid.

This method is equally well adapted for a mixture of murexide and picric acid. If the proportion of picric acid is very small, there will be formed—1. A lower band, purple and very broad. 2. A middle stripe, narrow and yellow; and lastly, the highest stripe purely aqueous. If, on the contrary, the mixture contains a large proportion of picric acid, the yellow middle band is larger, and the first, instead of being purple, is only reddish-yellow.

Picric acid is found in the same manner when mixed with fuchsine (hydrochlorate of rosaniline).

The existence of picric acid in crude fuchsine has not hitherto been proved, but the results given by this product with the strip of paper show that picric acid usually accompanies the red product.

By the immersion of several millimetres of a strip of filtering paper in an alcoholic solution of pure crystallised fuchsine, the rapid aspiration of the colored liquid is effected.

After the lapse of a few minutes four bands will appear; the highest, containing alcohol only, colorless, the three other colored with various shades of pure red, from light rose to dark, almost black, red. The darkest band will be in the middle. The addition of a little picric acid modifies these appearances, and produces three kinds of bands—1. Dark red and rose colored bands; 2. Colorless bands; 3. A beautiful yellow band, due to the picric acid. In proportion to the increase of picric acid the yellow band broadens, and the red-brown one produced by the fuchsine diminishes.

Crude commercial fuchsines behave in exactly the same way as the preceding mixture. In alcoholic solution they all give, besides the red bands, a larger or smaller yellow band.

Thus the author has undertaken an extensive series of researches both with solutions of pure coloring matters and with mixtures, and he is convinced that this ingenious process will prove very convenient for distinguishing rapidly the nature of coloring matters in mixtures, especially if well-chosen and characteristic reagents are used, so that applied to well-defined bands they will give precise indications of the kind of color isolated by infiltration.

This mode of analysis may also prove useful in medico-legal researches; for instance, in ascertaining the presence of picric acid in beer, or of various coloring principles in wine, syrups, pharmaceutical extracts, * &c.—*Lond. Chem. News*, Sept. 27, 1862, from *Rép. de Chimie pure et Appliquée*.

ON A GREEN COLOR WHICH MAY BE EMPLOYED IN CONFECTIONERY.

The finest green color is formed, as is known, from preparations of copper and arsenic; that of which the formula is here given is devoid of danger, and may replace it. To obtain it, infuse for twenty-four hours 0.32 grammes of saffron in 7 grammes of distilled water. Then take 0.26 grammes of carmine of indigo, and infuse it in the same manner in 15.6 grammes of distilled water. Then mix the two liquids together, and a very

* [M. L. Leroy; of New York, suggested a similar idea for pharmaceutical preparations. See *Amer. Jour. Pharm.*, 1861, p. 93.—ED. AM. JOUR. PH.]

beautiful green color is obtained, which may be employed for coloring an immense quantity of sweetmeats (10 parts of this solution will color 1000 parts of sugar of a very beautiful green.) This color may be preserved for a long time, either by evaporating the liquid to dryness or by converting it into a syrup.—*Lond. Chem. News, from Journal de Pharmacie et de Chimie*, xli. 286.

STATISTICS OF THE ALKALI TRADE OF THE UNITED KINGDOM, 1862.

Annual value of finished products, £2,500,000*l*.

Weight of dry products, 220,000 tons.

Raw Materials consumed per annum.

	Tons.
Salt	254,600
Coals	961,000
Limestone and chalk	280,500
Pyrites	264,000
Nitrate of soda	8,300
Manganese	33,000
Timber for casks	33,000
Total	1,834,400

Capital employed in the Manufacture.

In land	£235,000
In plant, buildings, &c	950,000
Working capital	825,000
Total capital	£2,010,000

Annual Cost of Material for Repairs.

Stone, bricks, slates, iron, lead, timber, &c. £135,500

Labor, not including Labor in Transit.

	Number of Hands.	Souls.	Annual Amount of Wages.
Directly employed	10,600	53,000	549,500
Employed in getting coals	3,100	15,500	112,840
“ making salt	420	2,100	16,380
Getting and breaking limestone	660	3,300	25,740
“ pyrites	4,030	20,150	157,150
Felling and sawing timber for casks	330	1,650	10,140
Total labor employed in the manu- facture, and in the preparation of raw materials used in it	19,140	95,700	871,750

Weight of Raw Materials and of Finished Products Transported.

	Tons per annum.
By inland navigation	481,350
By railway	1,154,300
By coasting vessels	722,300
By foreign-going vessels . . .	182,800
Total	2,540,750

Mem.—About one-fourth of the raw materials and finished products are transhipped in transit.

Weights of Waste Products.

	Tons per annum.
Alkali waste, burnt ores, cinders, slag, <i>debris</i> , &c. . . .	1,273,00
(Of this quantity, about one-third, say 450,000 tons, is transported by railways and canals; the remainder is deposited in close proximity to the various works.)	
Waste acid, muriate of manganese, lime, &c.	2,600,000
Total waste products	3,873,000

Manufactures depending upon the Products of the Alkali Trade.

Soap, Glass, Paper, Cotton, all, Linen, Woolen, Color making. All chemical manufactures of any magnitude.—*Lond. Chem. News*, Dec. 6th, 1862.

Varieties

Annual Report of the Board of Regents of the Smithsonian Institution for 1861: Washington, D. C., 1862. 8vo. pp. 463.—In his Report to the 'Board' as Secretary of the Smithsonian, Prof. Henry remarks:

"It could scarcely be expected that during the existence of an intestine war, and almost in the presence of two contending armies, the Institution should be able to conduct its affairs with the same persistence and success as in the tranquil years of its previous history. The interruptions and embarrassments, however, although frequent, and in some cases perplexing, have not prevented the continuance of the general operations of the Institution, or the prosecution of most of the special objects which had previously been determined upon as falling within the scope of the plan of its organization."

However this may be, we are struck in examining this report with its great interest as a record of the progress of science, as well as an index of the value of the important achievements made by the Institution itself in furtherance of the beneficent design of its founder to "increase and diffuse knowledge among men."

The Report of the Secretary addressed to the Regents, reviews the present condition of the fund, the income of which has been diminished by non-payment of interest on about \$60,000 of bonds of disloyal states, while a substantial addition to the fund has occurred of about \$25,000 from the falling in of an annuity heretofore paid to a relative of Smithsonian, now deceased. While the active operations of the Institution will not be curtailed by the existing state of civil war, no new undertakings of magnitude will at present be begun. The Secretary, as is his custom, reviews the contents of the publications of the Institution for the year, giving an analysis of the concluding paper, discussing the results of Dr. Kane's Arctic observations, and of a series of papers on the meteorological observations made during the voyage of Sir F. L. McClintock in search of Sir John Franklin in the Fox—1857-1859. These papers form part of the XIIIth volume of the "Contributions."

The *Miscellaneous Collections* include works intended to facilitate the study of the various branches of natural history, to give instruction as to the methods of observing natural phenomena, and a variety of other matter connected with the progress of science. Very properly, in view of its great value as a key to the accurate study of Geology, the Smithsonian has published a series of valuable works on Conchology. They are five in number as follows, viz:

1st. Elementary introduction to the study of conchology, by P. P. Carpenter, of England.

2d. List of the species of shells collected by the United States exploring expedition, by the same author.

3d. Descriptive catalogue of the shells of the west coast of the United States, Mexico, and Central America, by the same author.

4th. Bibliography of North American conchology, by W. G. Binney.

5th. Descriptive catalogue of the air-breathing shells of North America, by the same author.

The Secretary announces that the illustrations presented from the wood cuts of the British Museum Catalogue, by Dr. Gray, and designed to illustrate Dr. Carpenter's Elementary introduction, are now ready for distribution to all who have the work in a separate form.

The Smithsonian is also engaged in developing the history of American Entomology in a thorough and systematic manner, the details of which are given in the Secretary's report.

Ethnology also receives particular attention, and a large number of collaborators are engaged in working up this department of knowledge on which indeed the earlier volumes of the Contributions are particularly full.

The system of meteorological observations inaugurated by the Smithsonian at the outset of its career is still maintained, and the 2d volume of the Observations is nearly ready to be issued. The state of war has seriously impaired the receipt of records from the states in rebellion and to a

good degree, too, broken up the system of returns from the military posts of the Pacific coast.

The magnetic instruments sent to Key West have been constantly observed and the photographic records uninterruptedly kept up in spite of their nearness to the seat of war, at the joint expense of the Smithsonian and Coast Survey.

Under the heads of Laboratory, Explorations, Collections of Natural History, Museum, Exchanges, Literary, Gallery of Art, and Lectures, valuable information is given for which unfortunately we have not space.

Since the rendering of the last report two of the Regents have died and the present volume contains eulogies on Prof. C. C. Felton, by Dr. Woolsey, of Yale College, who was elected his successor, and also on Hon. Stephen A. Douglass, by his successor, Hon. Samuel A. Cox, of the House of Representatives of the United States.

The General Appendix contains a number of valuable memoirs, some of them prepared for the Report by their authors, others translated from the French or German. These are preceded by an abstract of the Lectures given before the Institution, by their authors.—*Extracted from the Am. Journ. Science and Arts, Nov. 1862. page 448-9.*

Occurrence of crystallized Silicon in Pig-Iron.—Prof. Robert Richter has discovered crystallized silicon in a specimen of crystallized pig-iron from a furnace at Gradaz, (Austria.) Fragments of the iron were treated with dilute chlorhydric acid until all the evolution of gas ceased; the residue was thrown on a filter, washed, dried and then heated in a platinum crucible in a stream of oxygen gas until all the carbon and iron were completely oxydized. The oxydized residue was boiled with concentrated chlorhydric acid, and after solution of the oxyd of iron there remained a quantity of graphite-like scales, which, examined under the microscope had a perfect metallic lustre, and a silver-white color. These scales remained unchanged when heated in oxygen, and were unacted upon when treated with chlorhydric and nitric acids: heated with nitre and carbonate of soda the scales were rapidly oxydized, and on further treatment the product of this oxydation proved to be silicic acid. The knowledge of the occurrence of silicon in pig-iron is a matter of importance for the ironmaster, as this may sometimes be the cause of the difficult welding, and other undesirable properties of some kinds of iron. For this crystallized silicon cannot be removed by the ordinary process of puddling; as has already been shown, it is not oxydized even when heated in oxygen gas. To remove crystallized silicon from iron in the puddling process it would be necessary to add soda, or perhaps litharge, in order to separate it.—*Am. Journ. Sci. and Arts, Jan. 1863, from Berg. u. Hüttenmännisches Jahrbuch der k. k. Montan-Lehranstalten zu Leoben und Przibram, xi. 289.*

G. J. B.

On the preparation of Ozone.—SCHÖNBEIN has given a method of obtaining ozone ($-O$) in comparatively large quantities and with great facility. Chemically pure, finely pulverized hypermanganate of potash is to be dissolved in pure sulphuric acid of density 1.85 [HO, SO_3], so that the liquid is opaque and has a deep olive-green color. The solution is to be introduced into a flask with two necks, arranged in such a manner that finely pulverized peroxyd of barium may be introduced at pleasure and the gas evolved collected over water. The gas obtained in this manner possesses all the properties of ozone as obtained by the slow oxydation of phosphorus or by electrolysis. Taken into the lungs it produces contraction of the chest and catarrh. It destroys organic coloring matters with the greatest energy; burns pyrogallie acid completely to carbonic acid and water; does not combine with water to form HO_2 , but reduces peroxyd of hydrogen to water, losing its smell and power of oxydation; it oxydizes lead, silver and arsenic in the cold; liberates iodine from metallic iodids; oxydizes the protoxyds of lead and manganese to peroxyds; converts sulphids into sulphates, and changes ferrocyanid to ferridecyanid of potassium. The gas thus possesses all the properties of ozone: it is however only a mixture of a small quantity of ozone with a large quantity of neutral oxygen. The author remarks that it is only the green solution of the hypermanganate which yields ozone in the above process. When the sulphuric acid is so dilute as to give a red solution no ozone is evolved.

BÖTTGER claims priority in the discovery of the above method of preparing ozone. He recommends a mixture of two parts of dry hypermanganate of potash with three of sulphuric acid, and finds that the addition of peroxyd of barium is wholly unnecessary, as the mixture slowly evolves ozone at ordinary temperatures. Böttger finds this mixture one of the most powerful oxydizing agents yet known. Ether, alcohol and the ethereal oils burst into flame when brought into contact with a mere trace, and flowers of sulphur are instantly converted into sulphuric acid, the action being attended by an explosive noise.—*Am. Journ. Sci. and Arts*, Jan. 1863, from *Journal für Prakt., Chem.* B. 86, p 70 and 377.

Sodium Amalgam is best made in the following manner:—Place a small hard glass flask with a narrow neck nearly up to the mouth on sand in a sand-bath, kept at a temperature of about 300° F. Weigh out the mercury and sodium; put the former in the flask, and then add the sodium in pieces as large as a pea at a time, waiting for the action to cease, before adding a fresh lump. The sodium had better be dropped in with a pair of tongs, and the hand should have a cloth over it. At each addition of the sodium a slight explosion will be heard, and a bright flame will issue from the mouth of the flask. The action gets less violent as the mercury becomes richer in sodium. When the whole of the sodium has been added, pour the amalgam into a flat dish whilst still liquid, and when cold break

it up and preserve in a stoppered bottle. It will not require to be kept under naphtha. The amalgam forms a mass of long, needle-shaped, brilliantly-metallic crystals, which interlace in every direction, but have very little cohesion.—W. C. *Lond. Chem. News, Oct. 25, 1862.*

Manufacture of Saltpetre.—Saltpetre is obtained in the Mammoth Cave, Kentucky, and considerable quantities were obtained from this source during the war of 1812. It is derived chiefly from the excrements of bats, &c. Most of all the saltpetre which is employed for the manufacture of our gunpowder comes from India. It is not known whether any saltpetre is now obtained from natural sources in the Southern States. If the Secessionists were deprived of this substance entirely, they could not carry on a war. The nitrate of soda is very abundant in many parts of the world, and were it not so deliquescent, it would answer just as well for making gunpowder as nitrate of potash. The formation of natural saltpetre is a very slow process, requiring about two years to complete. During the French revolution 2000 tons were made in one year in Paris; and were foreign supplies cut off, twice this quantity could be made in the same space of time in the city of New York with its present number of inhabitants. In Sweden, each peasant who owns a house is bound by law to make a certain quantity of saltpetre every year for the use of the State. In Spain, Egypt, Persia, and especially India, vast quantities of this salt are made annually: and it is not only a source of great profit but of warlike power to Great Britain.—*Lond. Chem. News, Nov. 8, 1862, from Scientific American.*

Cork.—*De la Production Naturelle et Artificielle du Liège dans le Chêne-Liège.* par M. CASIMIR DE CANDOLLE. (Ext. from the *Mém. Soc. Phys. et d'Hist. Nat., Genève*, vol. 1860), with three plates. This paper is interesting as the first botanical publication of the inheritor of this honored name in the third generation of botanists, and as an account of the formation and structure of cork in the Cork-oak, both in the natural state, and especially under the operation which has to be practiced in order to the production of cork of any commercial value. The operation consists in the removal from the trunk of the natural corky layer of the bark down to the subjacent cellular envelope or green layer; which is done in Algeria, (where young De Candolle's observations were made), during the summer or autumn. Shortly after this operation, a new corky stratum begins to form in the green layer, at a variable distance from its denuded surface. This grows by annual layers upon its internal face, just as the original and worthless corky layer did; but this is much finer and much more elastic, and is the commercial article. When this valuable cork has attained sufficient thickness, ordinarily after seven or eight years, it is also removed, with the same result as before, i. e., still another new corky

stratum is formed below ; and so successive crops may be taken off the trunk every seventh or eighth year for a long while, or even indefinitely. — *Am. Journ. Science Arts, Sept. 1862.*

Cinchona succirubra.—Dr. Anderson, of the Calcutta Botanical Gardens, having succeeded in forming an infusion of the leaves of the cinchona succirubra from the plants of that species in the cinchona nursery, near Darjeeling, reports to Government that four cases of intermittent fever have been cured by it. The infusion thus possesses some of the febrifuge properties of cinchona. It is dark chocolate-color, and is intensely bitter.—*Lancet, Dec. 6. and Pharm. Jour.*

Editorial Department.

THE SALE OF ALCOHOL BY APOTHECARIES. DOES IT REQUIRE A LICENSE?—Until the Revenue Law gets to be fairly understood by those to whom its carrying out is delegated, dealers of all kinds will be more or less annoyed by misunderstandings with the officers. We know of no class of dealers that are more burdened and incommoded by the working of this law than are apothecaries and druggists. Recently, the apothecaries of Pittsburgh as a body, appealed, through the Assessor, to Commissioner Boutwell against their liability for assessment as liquor dealers, when the following reply was received :—

“ Treasury Department, Office of Internal Revenue, February 4th, 1863. Sir : Your letter of the 2d inst., relative to the liability of apothecaries and pharmacutists to an assessment as retail dealers in liquors has been received.

“ Decision No. 18 contains the ruling of this office on the question. The provision in decision No. 105, quoted by the apothecaries merely exempts certain preparations from the stamp duty imposed on proprietary medicines.

Very respectfully, GEORGE S. BOUTWELL.”

Commissioner.

To Henry A. Weaver, Assessor 22d Dist., Penna.

“ Decision No. 18. Alcohol or spirituous liquors of any kind can only be used by an apothecary in compounding medicines. When sold otherwise, he will be required to take out a license as a dealer. A license to wholesale dealers confers no authority upon the party holding such license to retail liquor.”

On the other hand there is at least one of the assessors in this city who construes the law to exclude alcohol from the list of liquors confining the

meaning of the words to potable liquids, whether fermented or distilled ; and in this we believe he is in harmony with the spirit of the law.

SECTION 64, Article 4, in reference to the license for retailing liquors, is as follows : " Retail dealers in liquors, including distilled spirits, fermented liquors, and wines of every description, shall pay twenty dollars for each license. Every person who shall sell or offer for sale such liquors in less quantities than three gallons at one time, to the same purchaser, shall be regarded as a retail dealer in liquors under this act. But this shall not authorize any *spirits, liquors, wines or malt liquors to be drank on the premises.*" Now is it not evident that the kind of distilled spirits which the license is intended to cover is *potable* spirits, such as whiskey, rum, brandy, etc., such, in fact, as our State laws cover, and which in their greatest stringency have never had reference to alcohol, which is chiefly sold by apothecaries to the public for fuel, for cleansing purposes, and for medicinal purposes. The apothecary is pre-eminently the proper custodian of alcohol for public use, from the fact that it always has been, and must continue to be, more intimately connected with his regular business than with that of any other class of dealers. One half of his medicines are either made by aid of alcohol as a solvent, or contain it as a constituent. Already have the tax on whiskey and other causes raised the price of this fluid from 50 cents to \$1.30 per gallon by the barrel, an onerous burthen whence there is no escape. So far as we have been able to examine, the word *alcohol* does not occur in the law in any sense that can be construed to make it a taxable article. In Section 41, after enumerating how the duty on distillers of spirituous liquors shall be levied, it is said, : "*Provided that the duty on spirituous liquors and all other spirituous beverages* enumerated in this act shall be collected," &c., &c. Is it not here clearly indicated that the expression " spirituous liquors " as used in the law is intended to mean drinkable liquids ? and no one will class alcohol among these. We believe, therefore, that the decision No. 18 of Mr. Boutwell, wherein he uses the expression " alcohol or spirituous liquors of any kind " is not in accordance with the spirit of the law, and is a forced and unjust interpretation, which should be recalled. Speaking for ourselves, we are entirely ready to acquiesce in the law as it regards potable liquors sold *per se* by pharmacutists, but we do most earnestly protest against the necessity of an apothecary, who pays the Government a license for permission to conduct his business, being compelled to take out a liquor license because he retails alcohol for medicinal or domestic purposes.

Since the above has been in type we are pleased to hear that Congress, in Committee of the Whole on amendments to the Tax Bill, has adopted the following addition to paragraph 28, of section 64th, viz. : " Nor shall apothecaries who have taken out a license as such be required to take out a license as retail dealers in liquors, in consequence of selling alcohol." Should this be finally adopted, as we presume it will be, it settles this portion of the vexed question.

First Outlines of a Dictionary of Solubilities of Chemical Substances. By FRANK H. STORER. One volume in three parts, part I, Cambridge, Mass. Sever and Francis, 1863, pp. 232, royal octavo, double column.

We are indebted to the publishers at Cambridge, through J. B. Lippincott & Co., of Philadelphia, for the commencement of this valuable work, which was referred to in our July number. The book was received so near the time of our going to press that it will be impossible, in this notice, to enter as fully into the merits of the work as we hope to do on a future occasion. The author conceived the idea of his work whilst attending lectures at Paris, in 1856, owing to the need of a body of information in relation to the solubilities of salts, which further reflection determined him to extend to a regular dictionary of solubilities of all Chemical Substances, as far as they have been examined. At the beginning, the author prepared an alphabetical list of substances and their solubilities, from the standard works, intending to fill in the details from original memoirs until the leading chemical publications of this century had been searched and digested; but the great bulk of the manuscript, and its complexity from interpolation, presented so formidable a difficulty that he determined to print it in the present form, under the title of *Outlines*, leaving, to a future edition, the labor of perfecting many of the details. The author, in his prefatory remarks, declines all discussion of the philosophy of solution, as irrelevant in a dictionary of this kind, but defines what limits he proposes to himself in respect to solvents: "Thus, though in the term 'solubility of substance,' we ordinarily include only the comportment of the substance towards water, alcohol, wood-spirit, ether, oil of turpentine, benzin and analogous hydrocarbons, and other 'neutral solvents,' it is obviously, sometimes, proper to add observations on the action of acids and alkalies," etc.

In regard to the methods of effecting solutions which have so marked an influence on results, our author does not deem it apposite to enter into much detail; referring to Frezenius and other hand-books of analysis for directions; yet he points out the importance of knowing whether the solubility has been determined by digestion at the ordinary temperature; or by cooling from a hot saturated solution, and prefers the former method as less liable to give variable results. He refers to the difficulty arising out of super saturation, and the necessity of time and equality of temperature in making experiments. This is apparent to every observing apothecary in numerous instances. A saturated solution of sugar, by a change of temperature, commences to crystallize, when the process thus started will proceed beyond the point of saturation and weaken the solution. Again, in the solution of complex substances, so frequent in pharmacy, nothing is more common than for substances to be dissolved readily at first, which again precipitate on standing from apparent mutual interference, as in the action of weak alcohol on cinchona bark, the cinchonic red at first,

abundantly taken up, commences to precipitate very soon after. So important do we deem the subject of the influences which control solubility, that we would earnestly encourage the author, should the opportunity offer in a future edition, to give an introductory chapter relative to the several normal solvents, the influence of purity or strength on their power; the methods of applying them, grouping analogous cases, and specifying important instances of variation. For instance, one author will state the solubility of a substance in ether and alcohol, and give no statement of their strength, using, perhaps, alcoholic ether, or hydrated alcohol, and the next experimenter presuming that the pure solvents have been employed, gets with these different results.

In regard to nomenclature the author necessarily has had to contend with a formidable difficulty, and has had to exercise his judgment with much care in determining names and synonyms. We are sorry to find that he has not adopted the termination "*ia*" or "*a*," for the organic alkaloids, to distinguish them from neutral substances, which terminates in *in*, and it is not quite satisfactory to us that he has adopted the centigrade scale for temperature, in a work addressed to English and American readers more especially, yet the idea may be to urge the adoption of this scale parallel with decimal weights in all scientific records.

In glancing over the text, the reader is at once struck with the comprehensiveness of the plan of the work, not only in regard to rare and isolated substances, organic and inorganic, but to groups of salts of acids, even the names of which are not always met with in ordinary works; for instance, the solubility of 30 salts of cinnamic acid and 22 salts of chrysammic acid are noted, whilst antiarin, asbolin, bixin, cantharidin, catechin, carotin, casein, cellulose, etc., come in for due notice. On the other hand important bodies like acetic, arsenious and carbonic acids, with their groups of salts, are described very fully, more than twenty-two pages being devoted to the carbonates, of which, at least 144 are noticed. We observe that important salts like carbonates of potassa, soda, baryta, magnesia, zinc, strontia, etc., are examined in detail, a large number of observations being brought together, and references to original papers interspersed. The type, though small is clear, and the paper good. If the work is finished in the same manner as it has been begun, it will be exceedingly valuable to practical as well as to theoretical chemists, and the apothecary and the manufacturing chemist will find its pages stored with information needed on numerous occasions, and which here is presented to them in the most accessible form. We cannot conclude our notice better than by extracting a single item which will convey a better idea of the style of the work:

BENZOIC ACID. Soluble in 607 pts. of water at 0°. (Kolbe & Lautemann, *Ann. Ch. u. Pharm.*, 115. 187. [K.]
Soluble in 480 pts. of cold water (Lichtenstein); in 200 pts. of water at 18.75°, and in 24.5 pts. at boiling (Bucholz

Gehlen's Journ. für Ch. Phys. u. Min., 1810, 9. pp. 340, 355); in 500 pts. of cold water (Dörffurt, Bergman); in 24 pts. of boiling water (Dörffurt, Lichtenstein, Bergman); in 400 pts. of cold water (?); in 30 pts. of boiling water (Trommsdorff); in 160 pts. of water at 18.75° (Abl, from *Oesterr. Zeitschrift, für Pharm.*, 8. 201, in *Canstatt's Jahresbericht, für 1854*, p. 75). 100 pts. of water at 15.5° dissolve 0.208 pt. of it. 100 pts. of water at 100° dissolve 4.17 pts. of it. (*Ure's Dict.*) 100 pts. of the aqueous solution saturated at the ordinary temperature contain 0.5 pt. of it, and 3.25 pts. when saturated at 100° . Readily soluble in water containing 1.5 pts. of phosphate of soda, or 4 pts. of sulphate of soda. (*Ure.*) Soluble in 1.79 pts. of absolute alcohol at 18.75° , and in rather more than 1 pt. at the temperature of boiling. (Bucholz, *Gehlen's Journ. für. Ch. Phys. u. Min.*, 1810, 9. pp. 342, 355.) Abundantly soluble in alcohol, from which it is precipitated on the addition of water. (Lichtenstein.) Soluble in 1 pt. of boiling alcohol. (Wenzel, in his *Verwandtschaft*, p. 302 [T.].) 100 pts. of cold absolute alcohol dissolve scarcely 56 pts. of it. (Bucholz, cited by Wenzel, *loc. cit.*) Soluble in 25 pts. of ether, either hot or cold. (Bucholz.) 100 pts. of oil of turpentine dissolve 0.4 pt. of it; and at 100° more than their own weight, the acid crystallizing out on cooling. (Lecanu & Serbat.) Readily soluble in fixed and volatile oils, and in benzoic ether.

Soluble in benzin and the other light coal-naphthas. (Dela Rue.) Largely soluble in hot caoutchou, a portion crystallizing out again on cooling. (Himly.) Soluble in creosote. (Reichenbach.) Soluble, without decomposition, in cold concentrated sulphuric acid, from which solution water precipitates it. (Lichtenstein.) Also soluble in nitric acid and sulphurous acid. Insoluble in chlorhydric or phosphoric acids. Hot acetic acid dissolves it precisely as water does, but it crystallizes out again when the acid cools. (Lichtenstein.)

Most benzoates are soluble in water; many of them being readily soluble. Many are soluble also in alcohol. The more sparingly soluble benzoates dissolve readily in aqueous solutions of acetate of soda, or of acetate of lead, and of nitrate of soda; but they do not dissolve in solutions of nitrate of potash, or of sulphate of soda, or chloride of sodium. (Lecanu & Serbat.)

Report of the Commissioner of Patents for the year 1861, Agriculture, Washington; Government Printing Office, 1862. Ex. Doc. No. 39, 37th Congress, 2d Session—Senate, pp. 654, oct.

Our acknowledgments are due to J. W. Forney, Esq., Secretary of the U. S. Senate, for a copy of the Agricultural Report of the Patent Office, last issued. The plan of printing the Agricultural portion of the Report, in a separate form, is a great improvement on the old way of mingling all the Reports in one volume. Among the items in the Report most prominent are the history, industry, and commerce of flax, by D. J. Browne, of the Patent Office; on the culture and manufacture of flax and hemp, by O. S. Leavitt; on sheep-raising and wool-growing, by W. S. Colohan; on artificial manures, by Prof. C. Upham Sheppard, of Charleston, S. C.; on raspberry culture, by J. A. Warder; on strawberries, by the same, and W. R. Prince; on the consumption of milk, by Silas L. Loomis, M. D.; on the destruction of noxious insects; on the pear orchard; on Indian corn; on sorghum culture and sugar-making, and on the grape culture and wine-

making. The work, if extensively distributed, must have a beneficial influence by exhibiting to the farmers in general what results some of their number have obtained. It would be worth the attention of Mr. Browne, or some other gentleman of the Patent Office, to give a glance at the culture of medicinal plants and the collection of indigenous drugs as a part of the aggregate productions of this country, and the several communities of Shakers who devote time to this object, and the systematic gathering of wild medicinal plants in the great West, of which Cincinnati is the focus, are the chief points to which the inquiry should be directed. Again, it is suggested that the department institute an inquiry in regard to the possible collection of *argols* or *tartar* in our several wine regions. The immense advance in tartaric acid and all tartrates, owing to the scarcity of tartar, is patent to every druggist and consumer of cream of tartar.

OBITUARY.—Since our last issue, death has removed one who was intimately connected with our profession.

We allude to the sad yet glorious death of ADOLPH G. ROSENGARTEN, at the battle of Murfreesboro', Tennessee, on the 29th of December last, just as he had completed his 24th year. His earliest connection with our profession was about eight years ago, in the retail drug business, to familiarize himself with the appearance and physical properties of drugs, under the direction of the writer of this notice; after which, he went to Europe, where he remained about three years, engaged in the study of his profession. Immediately upon his return he took an active part in the manufacturing laboratory of his father and brothers in this city, and the success which attended his efforts there fully attested the industry and enthusiasm with which his studies while abroad had been prosecuted.

In the summer of 1861, he joined the Anderson Troop as a private; before they moved from Carlisle he was made orderly sergeant, then a lieutenant, and after the troop was recruited to a regiment, he was made senior major. His promotion gave great satisfaction to all under him, as well as to those in whose commands he had served. Thorough in everything, he was especially so in his military duties, and sad to all who were acquainted with him was the announcement of his death; he fell almost within the lines of the enemy, with twelve bullets in his body. So closed the life of one, who at the early age of 24 had given such rare promise of distinguished ability in the quiet walks of practical science, as well as in the stern duties of a soldier's life.

In his friendship he was warm and sincere, and though manly, so refined was his demeanor at all times, that the most polite ear could take no exception to any remark that might escape his lips. Admired as he was by a large circle of friends, his home was the place where the beauty of his character was most fully seen, and there will he be mourned and missed when others attached to him by the warm ties of friendship shall have lost their sorrows in contemplating the beauty of his character. T. S. W.

THE
AMERICAN JOURNAL OF PHARMACY.

MAY, 1863.

THE BARK OF THE ROOT OF MYRICA CERIFERA.

By GEORGE M. HAMBRIGHT.

(An Inaugural Essay.)

The plant which yields the Bayberry bark is also called Wax-Myrtle—Candle-berry Myrtle. Nat. Order Myricaceæ, Sex. Syst. Dioecia Tetrandria. There are four American species of this shrub, viz. : *M. gale*, *M. carolinensis*, *M. pennsylvanica* and *M. cerifera* ; the latter forming the subject of my essay, which was suggested as being worthy of consideration.

The bark, however, will receive my attention only ; as it seems to be the medicinal part of the plant of this species, and the only one that is noticed by the text-books.

Myrica cerifera.—This shrub, a native of the United States, is found growing along the Atlantic sea coast from Florida to the New England States, and more particularly in the eastern part of New Jersey ; attaining a height of from three to twelve feet, much branched, presenting a fine contrast with the barren soil which surrounds it. “ Leaf, two to four inches long ; one-half to one inch wide ; lanceolate, mostly obtuse ; entire pubescent underneath, and tapering into a petiole. The flowers, which appear in May or June, before the leaf is fully expanded, are in short axillary aments, dioecious, each in the axil of a scale-like bract, calyx and corolla none ; stamens two to ten, with the filaments united below ; ovary enclosed in a cup of three to six rounded scales ; stigma two, flattened on the inner surface. The fruit or berry is globose, being covered with a down of an ash grey color, having a waxy appearance.”

The berries when boiled in water yield their waxy coat, which, being collected and formed into cakes after purification, constitute the "Myrtle Wax" of commerce.

It is reputed to possess medicinal virtues, but the most general use to which it is applied, is by the residents of the rural districts of New England and New Jersey, who use it, either alone or combined with tallow, for making candles or stiffening the ends of lamp wicks. Hence, it is often called *Bayberry tallow*.

As a remedial agent, it first attracted attention about the year 1822, when it was successfully employed by the late Dr. Wm. M. Fahnestock, in an epidemic of typhoid dysentery; which prevailed at Harrisburg, Penn'a., at that time.

It is not my purpose to dwell on this subject; I shall therefore proceed to investigate the bark of the root.

Physical properties of the bark.—The bark, as found in the shops, is in pieces from one to six inches long, with a grayish mottled appearance, and slight transverse fissures externally, and covered by a paper-like epidermis, which gives it the variegated character as above mentioned. This can be readily separated from the true bark by means of a knife, when the exposed surface is rugged and admits of being highly polished.

The pieces are usually curved or quilled, presenting a dull reddish-brown color externally, after the covering has been removed; internally the color is much darker, approaching more nearly a brownish hue. It breaks with a short fracture, exhibiting at the ends the ligneous fibres, and giving rise to a small amount of dust, which excites sneezing when brought in contact with the lining membrane of the nose.

Its taste is peculiar, at first slightly bitter, then a decided astringent and acrid impression follows, attended with a stinging sensation on the end and along the edges of the tongue, extending to the fauces, where it leaves an unpleasant feeling with a sense of constriction. The dry bark floats in water, until it becomes thoroughly saturated with moisture; when it sinks, imparting an amber color to the infusion.

The powder is of a light brown color, with a pungent and peculiar spicy odor, strongly sternutatory and exciting cough, and possessing the property of frothing when it is agitated with water.

From the violent sneezing produced by the particles of bark which float in the air, and the dense froth occasioned when a small quantity of the powder is stirred briskly with water, I am induced to believe that it contains a principle analogous to, if not identical with, *Saponin*. It yields its virtues to water and diluted alcohol. The latter being the *best* menstruum.

Chemical investigation.—Four hundred and eighty grains of the finely-bruised bark were macerated in water for twelve hours, then displaced until eight ounces of liquid were obtained. This had a fine red color, and possessed the astringent taste and peculiar odor of the bark.

Solutions of tannic acid, sulphate of copper and corrosive chloride of mercury, produced precipitates when added to the above infusion, indicating the presence of *albumen*. Tincture of sesquichloride of iron caused a dense blue-black precipitate of tannate of iron, and solution of gelatin a curdy precipitate, proving the existence of a large amount of *tannic acid*.

The tannin existing in a portion of the infusion was precipitated by gelatin and the liquid filtered. To the filtrate, tincture of sesquichloride of iron was added, when a characteristic dark precipitate was eliminated, which disappeared on the application of heat. This is a proof that *gallic acid* is one of its constituents.

The dregs left from the infusion were boiled in water and filtered while hot. After cooling, tincture of iodine produced with the filtrate a fine blue color, which was destroyed by heat. By which test we recognize the presence of *starch*.

Solution of sub-acetate of lead threw down a curdy precipitate, which is an indication that *gum* enters into its composition.

One thousand grains of the bruised bark were exhausted with alcohol (.835), the resulting tincture was of a deep red color, resembling Port wine. It had a peculiar biting taste, with some astringency.

A portion of this was evaporated on a sand bath, which yielded a dark shining extract which was slightly acted on by water and ether. Another portion was evaporated to a semifluid consistence and spread on glass to dry. This extract when powdered constitutes the "*Myricin*" of the "*Eclectics*." Another, form

of this resinoid principle is prepared by throwing a concentrated tincture on water, which precipitates the resin.

The only difference between the two products is, that the latter resin is deprived of a little coloring matter together with some of its astringency.

The water into which the tincture was thrown, and from which the resin had been separated, was evaporated and spread in thin layers upon glass. When dry it formed red transparent scales, with little taste and no odor. These are soluble in water, forming a light red solution. *Red coloring matter* also enters into its composition.

One thousand grains of bruised bark, which had previously been macerated in water, were introduced into a distillatory apparatus and the heat gradually applied. The distillate was slightly cloudy, possessing the odor of the bark in a very marked degree, and a perceptible empyreumatic odor was also noticed.

A volatile oil is believed to exist in it, although the foregoing experiment did not satisfactorily verify the truth of the statement, as the amount of bark operated upon was too small to be attended with any definite result.

Six hundred grains of powdered bark were exhausted with ether (.750). The ethereal tincture was of a light straw color, which, by spontaneous evaporation, left a thick viscid extract of a yellow color. It had an acrid nauseous taste, with some resemblance to that of the extract of valerian. Cold water did not affect it; by boiling, it is separated into flocculent masses; it is soluble in hot 95° alcohol which deposits it on cooling. It burns with a brilliant light and not much smoke, giving rise to an aromatic odor. After becoming thoroughly dry, it was readily reduced to powder. During this process it cakes under the pestle, owing to the heat generated during the trituration.

This substance I take to be an *acrid resin combined with wax*, or a modified form of wax as it exists in embryo, in the vessels of the plant, before being deposited on the berry, and thus exposed to the chemical action of sun-light and air.

Five hundred grains of bark were exhausted by a menstruum composed of one part of water and three parts of alcohol. The liquid was evaporated, and water added from time to time, until

all the resin was precipitated. This was removed, and the remaining liquid evaporated to a thin syrupy consistence and set aside.

A deposit soon formed, which was collected, washed with alcohol and dried, yielding a mass of crystalline plates of a dirty white color.

The bark which was exhausted as above, was then treated with hot water, which gave a small quantity of *extractive matter*.

Investigation of the aqueous extract.—The aqueous extract prepared by careful evaporation at a temperature of 80° Fahr., was entirely soluble in cold water, forming a slightly cloudy solution. Not acted on by ether or chloroform, slightly soluble in cold, and about one-half taken up by boiling alcohol. It had not much odor, but a strongly astringent taste, with very little acidity. A portion of this extract was treated with boiling absolute alcohol, which dissolved about one-third. This was digested with animal charcoal, filtered through the same substance and evaporated, which left a resinous extract having an astringent taste, and which produces precipitates (black) with the sesqui-salts of iron.

Investigation of the alcoholic extract.—This extract, while warm and of the consistence of molasses, presents a dark, shining, uniform appearance; on allowing it to stand for twenty-four hours, a deposit of a yellow color took place throughout the mass, and which remains diffused as the mass hardens.

Sixty grains of this extract were treated with ether, which dissolved one-third; which solution, after evaporation, left a resin having a granulated appearance, similar to fused wax when it is thrown into cold water. This, on examination, proved to be identical with the resinoid substance obtained by percolation with ether as described above. That part of the extract not acted on by ether was redissolved in alcohol and evaporated. The result was a red, brittle resin, translucent, with a purely astringent taste. The inference which we draw from these experiments is, that the bark contains *two resins, both soluble in alcohol and one in ether only*.

The bark which was acted on by ether was then treated with absolute alcohol until it was exhausted. This tincture was evapo-

rated, at a temperature of 85° , to one-eighth of its original bulk and allowed to stand.

At the end of twelve hours a slight deposit was observed on the bottom of the capsule, presenting to the naked eye a mass of granules. This continued to increase until twenty-four hours after I first made the observation, when it assumed a crystalline form, in plates or flat prism-like masses arranged on strings, having some resemblance to rock candy.

The supernatant liquid was decanted, the deposit treated with a small quantity of alcohol and put into a test tube. It soon precipitated to the bottom, when the alcohol was decanted and the powder collected. This substance seems to be identical with that obtained by the process mentioned on page 197. When first collected it had a hydrated appearance, which was somewhat reduced by desiccation.

When dry, it separated from the capsule in masses or granular groups. It had not much taste at first, but it soon renders its presence evident by the persistent action exerted on the fauces as it is gradually dissolved by the saliva, and which is rendered still more evident when water is taken into the mouth. It is sternutatory, soluble in water, forming an opalescent solution. The smallest quantity produces a thick froth when it is agitated with water, which remains permanent for some time. It had not all disappeared at the end of thirty-six hours. An excess of cold alcohol does not form a perfect solution. Hydrated ether and chloroform possess little or no action on it.

Exposed to heat, it swells and blackens, but does not volatilize. In the air it is inflammable, giving off smoke and an aromatic odor resembling that of burnt coffee. Muriatic acid turns it yellow. It is decomposed by strong sulphuric acid. Nitric acid dissolves it, forming a slightly turbid solution; on the application of heat the liquid is slightly coagulated, after which an energetic reaction takes place, evolving disagreeable gaseous fumes, which continues after the flame of the lamp has been withdrawn. The result is a perfect transparent solution. A new compound seems to be generated by this reaction, the nature of which I have not determined.

With reagents it gives the following results, viz. :—Nitrate of Silver, a light red color; Nitrate of Baryta, no change; Oxal-

ate of Ammonia, a slight cloudiness ; Bichloride of Mercury, no change ; Subacetate of Lead, a light yellow precipitate ; Bichloride of Tin, a golden-yellow precipitate ; Bichloride of Gold, a deep purple color.

It has an acid reaction on litmus, and alkalies and their carbonates produce deep yellow solutions. With aqua ammoniæ it causes a curious reaction. A small portion was agitated with water ; to the turbid solution thus formed ammonia was added, which immediately produced a deep green, transparent solution ; this quickly changes to red, and finally yellow.

By throwing this chameleon-like solution (if such I may call it) into water, it first gets green, next red, and lastly yellow. The play of colors in the latter instance succeed each other with much more rapidity than in the former.

When in solution or suspended in water, it unites very readily with ammonia and potassa.

The ammoniacal solution by evaporation produces needle-shaped masses of a black color, and the potassa solution crystalline plates of an orange-yellow color, both losing the power of frothing when agitated with water.

The above lengthy experiments with this peculiar substance were made with a view of deciding whether this bark contained a substance analogous to *Saponin*, as was suspected and noted in the beginning of my remarks, and which I conclude is here isolated. But, on comparing my notes with those of Messrs. Bucholz and Bussy "On Saponin," in the 19th vol. *Journ. de Pharmacie*, I find that the above results agree in but few of the experiments, and I therefore conclude, that the crystalline principle is one peculiar to the bayberry bark, and, for want of a better name, will call it *Myricinic Acid*, to distinguish it from *Myricin*, one of the constituents of the wax obtained from this plant.

A few grains of *Myricinic Acid* were redissolved in boiling alcohol and filtered, and the filtrate put into a watch glass, and permitted to evaporate. After standing a few hours the crystals were deposited in globular masses of a white color ; on looking at the substance again, I found the summits of the granules were tinted with yellow, caused no doubt by the vapor of ammonia coming in contact before they were perfectly dry, and

to the action of which alkali it is extremely susceptible, and which serves to detect it in the most minute quantities by the yellow color which is produced. One of the grains, on being placed under the microscope, appeared to be composed of numerous acicular crystals, arranged around a common centre, which, on being broken, gave microscopic crystals like sulphate of morphia.

Inorganic constituents.—One thousand grains of bark yielded, after incineration in a crucible, one hundred and twenty-five grains of a light-colored ash, which effervesced with acids. A solution was made from a portion of the ashes with hot water, which had an alkaline taste; tartaric acid added to the solution caused a precipitate of *bitartrate of potassa*; carbonic acid gas a white precipitate; and oxalate of ammonia, an insoluble precipitate of *oxalate of lime*.

Sixty grains of the ash were treated with water and filtered. No indications of the presence of iron were given in this solution. Chlorine gas was then passed through another portion of the solution. The chlorine was driven off by heat, when the addition of ferrocyanide of potassium caused a deep blue precipitate. By this process we infer that *iron exists* as a *protoxide*.

One hundred grains of the ash were digested in dilute muriatic acid, the solution filtered, and the lime precipitated by an excess of carbonate of ammonia, which was removed by filtration and the filtrate boiled. After cooling, a solution of phosphate of soda, threw down a precipitate of *phosphate of magnesia*.

That portion of the ash not affected by muriatic acid was boiled with liquor potassæ and filtered. The solution was diluted with water and muriatic acid added to saturation, when a precipitate of *hydrated silicic acid* was produced.

Lastly, the ash left untouched by the acid and potassa was fused with potassa, which formed a compound readily soluble in water. This I take to be *silicious sand*.

From the foregoing analysis we may conclude that the bark of Bayberry Root contains the following organic and inorganic constituents:

Organic constituents.—Albumen, tannic acid, gallic acid,

starch, gum, red coloring matter, extractive matter, volatile oil, (traces,) an acrid resin soluble in alcohol and ether, an astringent resin soluble in alcohol, insoluble in ether; myricinic acid (a peculiar principle possessing properties analogous to saponin), ligneous fibre.

Inorganic Constituents.—Salts of potassa, salts of lime, protoxide of iron, magnesia, silicic acid.

Medicinal properties and uses.—This drug, which is used by the "Eclectics," is reputed to possess tonic and stimulant properties, combined with a considerable amount of astringency, which latter quality renders it eminently valuable in the treatment of diarrhoea and dysentery. Its peculiar acrid property also renders it useful in catarrhal complaints, then acting as a very efficient errhine.

It is placed in the official list of remedies of the Thomsonian's, by whom it is used as a specific for jaundice. It also constitutes one of the chief ingredients in their so-called "*Composition Powder*." The powdered bark, when given in large doses, is actively emetic, caused by its irritating action on the mucous membrane of the stomach.

In fact, it has been asserted to possess emetic properties equal to ipecacuanha; the truth of this or any of the above statements in regard to its therapeutical virtues I cannot substantiate by actual experiment, as circumstances would not permit me that pleasure.

As far as I am informed, this article under consideration has not even received a passing notice from the recognized School of Physicians (Allopathic,) but is slighted for the reason which is given by our honored Professor of Materia Medica, when speaking of drugs of a similar nature, "that American practitioners, instead of employing our indigenous plants, prefer using those from a foreign country, which are not so good but much more *expensive*."

The dose of the extract is stated to be from five to ten grains; of the powder, twenty to thirty grains; and of the myricin, (or resinoid matter,) from two to five grains.

Its properties must, therefore, reside in the two resins, acrid and astringent, and perhaps in the substance called *myricinic acid*, as the future may determine.

Feeling fully confident that the bark contains virtues of no mean value, as a remedial agent, and trusting that its actual therapeutical properties will be determined by the medical profession, I shall reserve this as the basis for a future paper, when I hope I will be able to institute a more thorough investigation.

Philadelphia, January, 1863.

FORMULA FOR AN AQUEOUS SOLUTION OF BROMINE TO BE USED FOR MEDICINAL PURPOSES; AND SUGGESTIONS FOR THE THERAPEUTICAL USE OF CHLORIDE OF BROMINE.

BY J. LAWRENCE SMITH, M. D.

Of the Louisville Chemical Works.

The increased demand for bromine from the Louisville Chemical Works, where it is kept for the purpose of making the different compounds of this substance, induced me to inquire for what purpose it was used, and I learned that it is being employed largely as a therapeutical agent, either in the form of vapor mixed with air or as an antiseptic in purifying the atmosphere of hospitals where erysipelas, gangrene, scarlatina, small pox, &c., exist; also, locally in some of these diseases, and internally in diphtheria, &c. Knowing full well the inconvenience of the use of this substance in the form called for, I at once undertook to compound a solution that would meet the ends required, and be more convenient for any therapeutical use to which uncombined bromine might be applied.

From the slight solubility of bromine in water, any attempt to dissolve it in this liquid would give too dilute and bulky a solution; the natural suggestion, therefore, was to use but little water, and facilitate its solubility by the addition of bromide of potassium. The first formula used was 1 troy ounce of bromine, 120 grs. bromide potas. and 1 fluidounce distilled water. This formula left a small quantity of bromine undissolved, and the solution was too concentrated. After varying in the proportion, the following is considered the most convenient formula:—

Take of Bromine, 1 troy ounce.

Bromide of potassium, . . 160 grains.

Distilled water, q. s.

To make four fluidounces of the whole mixture. Dissolve the bromide of potassium in about two fluidounces of water, add the bromine, agitate, and finally add enough water to bring the whole to four fluidounces, then mix thoroughly, and keep in well stoppered bottles; if much of the solution is made, it is better to divide it into small packages of two to four ounces, than to keep it in one large bottle to dispense from, for the vapor escapes so readily from the solution, that if there be much space in the bottle bromine will be lost. This makes a dark red solution, evolving strong fumes of bromine, and readily soluble in any additional quantity of water. I have given this formula as one that will doubtless recommend itself to those of the medical profession engaged in using bromine. Its effects when applied locally in hospital gangrene are said to be very remarkable.

Notwithstanding the above solution seems to be all that can be desired where bromine is to be used, I would recommend to the medical profession the use of a compound of bromine that must have energetic effects in the same direction as the pure bromine, namely, the *chloride of bromine*. This is soluble in water, and a solution of it might be kept and employed in the same way as the solution of bromine. I shall shortly have some of the chloride of bromine made and experimented with.

NEW FORM OF DRY PERSULPHATE OF IRON.

BY J. LAWRENCE SMITH, M. D.

Of the Louisville Chemical Works.

The use of the persulphate of iron has been very much extended in the last few years, and various formulæ have been proposed for making it, all of which are very good. But it is not in forming the solution that there is any thing needed, but it is the transformation of it into a solid that most is desired. Some have dried it on plates in a hot-chamber, and others have dried it by the direct application of heat, giving it a porous structure not unlike tannic acid when first dried. I have given to it these forms successively, but they all have objections. Heated on plates, if the temperature be too light, or continued too

great a length of time, a portion becomes insoluble, other forms are deliquescent, and soon become moist in contact with the air. Having succeeded in drying it into an almost impalpable powder unalterable in contact with air, and very soluble in water, I propose describing, as near as possible, the method by which this is arrived at. As regards the solution of persulphate I am not very particular about the formula, preferring, however, one proposed for Monsel's persulphate

Sulphate iron, 100 troy ounces.

Distilled water, 2 gallons.

Sulphuric acid, 5 troy ounces.

Nitric acid, 5 troy oz. or q. s.

for peroxidizing the iron, when the whole is brought to the boiling temperature. The manner of doing this is familiar to all operators. The solution is allowed to cool somewhat, then filtered and concentrated to a density of 1.60. It is now allowed to cool, and poured into shallow plates to the depth of one-sixteenth or one-fourth of an inch, and a little of the dry powder obtained from a previous desiccation is scattered on the surface of the liquid in each plate. The plates are then placed on shelves in a part of the laboratory where a little steam is escaping, and the temperature is from 75° to 100° Fah., according to the season.

In my works, shelves are constructed 2 or 3 feet above a series of steam jackets in which live steam is used, and always more or less escaping from the sides of the jackets. In from 24 to 48 hours the contents of each plate begin to rise in cauliflower excrescences, that after a little longer exposure become dry, and rub down between the fingers to an impalpable powder; and when rubbed down and passed through a tolerably fine iron sieve, has very much the appearance of mustard. It can be exposed to the air without its absorbing moisture or undergoing any alteration. When thrown into water, the water becomes turbid, but in a few moments clears up, affording a red solution. It is soluble in a very small quantity of water. When it is desired to use it in the solid form as a styptic, it can be taken in the fingers and scattered on the wound or other surface as any other powder may be applied. This manner of drying a substance considered deliquescent, doubtless appears a very singular

one, and it certainly was not suggested by any train of reasoning, but discovered altogether by accident, and I have tried to bring about the result by other arrangements, but the solution placed on shelves in the same room not more than ten feet off, but not exactly under the same condition of vapor and temperature, acts entirely differently; the solution, instead of drying, becomes more dilute from absorption of moisture. In the drying room proper, it solidifies into a hard mass. Accompanying this note I send a specimen of the persulphate.

OXYCOCCUS MACROCARPUS, (CRANBERRY.)

BY GEORGE W. ELDRIDGE.

(Extracted from an Inaugural Essay.)

Artificial System: Octandria Monogynia.

Natural Order: Ericaceæ.

This is a small prostrate shrub, with threadlike runners, from one to six feet in length supporting vertical branches, on which are borne the lengthened axillary pedicels bearing the corolla. The corolla has sublinear reflexed segments with lanceolated points, and is succeeded by the fruit, a berry of a light scarlet color when not exposed directly to the sun, but one side dark brown when growing on the upper branches. The leaves are alternate, slightly revolute, and supported on very short petioles, their color conforming as near as possible to that part of the plant on which they are placed; the oldest being of a dark brown color, having passed in their growth through many intermediate shades of color, from a purple in the recent shoots to a greenish hue, light at first, and then darkening as they become older. The roots in their native meadows are similar to the branches in many respects; and in fact seem to be but subterranean stems.

The wild cranberry, inhabiting the open boggy meadows of the coast, from Maine to North Carolina, and those also of Wisconsin and Michigan, is an exceedingly hardy little plant, and prolific bearer, when in a favorable situation: being so in almost all soils, if not overpowered by other plants. The soil best adapted to its growth appears to be a loose composition of decay-

ing vegetable matter, with silica and an abundance of water. This modest little plant has not attracted the attention of agriculturists, until within a few years. The inhabitants of Cape Cod appear to have first realized the advantages of cultivation upon both the quantity and quality of its fruit. Their success induced others to attempt the cultivation of this plant, so that now it is a staple article of produce in some districts of our country. The amount annually cultivated and brought to Philadelphia from New Jersey amounts to several thousand bushels, and is still on the increase. The mode of cultivation found to be most successful in New Jersey is first to reclaim a meadow or swamp through which passes a small stream of water, which element seems most essential to its growth. The land thus reclaimed is cleansed as thoroughly as possible from all roots and rubbish. The soil is then broken up by the plough and harrow, and furrows are made four feet apart. The plants are then arranged one foot apart in the furrows; the roots being covered with a sufficient quantity of earth. Thus placed, the runners will, with careful culture, nearly cover the ground the third year, and the fourth year a crop may be expected, meanwhile the overseer prepares dams and gates, and through the winter and at other times when necessary overflows the plants with water as a protection from frosts and insects. They flower in June, and the fruit ripens in October, at which time they should be gathered as soon as possible to avoid frosts. The fruit is solid and durable when gathered in good condition at the proper season.

This subject being suggested to me by a graduate of this College, now extensively cultivating the fruit in the State of New Jersey, I concluded to make an investigation of the fruit for the purpose of ascertaining what acid exists in the berry and in what quantity.

Four ounces of the berries were bruised and expressed through strong linen. The dregs were then transferred to a glass funnel, using water as the menstruum until exhausted. The resulting liquid was then added to the pure juice, which measured four fluid ounces; one part of strong alcohol was then added to four of the diluted juice, and heated to the boiling point to coagulate the pectin and albuminous substances, which were separated by

filtration. The alcoholic liquid or juice was then evaporated by means of a water bath until all the alcohol disappeared. It was then diluted with a small portion of water and passed through pure animal charcoal until the coloring matter was entirely removed. The liquid has then the appearance of pure water, but is quite acid. To a portion of the acid liquid, basic acetate of lead was added which threw down a dense white precipitate entirely soluble in nitric acid and citrate of ammonia.

A solution of carbonate of potassa in excess was added, but caused no change. Tartaric acid produced no change, cold or hot. Lime water no precipitate in the cold or by boiling. Chloride of calcium produced no precipitate, even on boiling. Boiled with sulphate of copper and liquor potassæ suboxide of copper was thrown down by the grape-sugar present. The combined tests satisfactorily prove the acid present in the berry to be citric acid, without the presence of any oxalic acid. And experiments were now made to ascertain the percentage in which it existed in the fruit.

The remainder of the diluted juice was then evaporated on a water-bath to the consistence of a thin syrup, having a very sharp acid taste. This was set aside for four weeks for the purpose of ascertaining whether the crystals could be obtained by this process, but without success. The syrupy liquid was again tested for citric acid, to ascertain whether any change had taken place during this time, but I was unable to detect any change whatever in the acid, except that it had become quite thick by spontaneous evaporation, and by the presence of a large amount of gum found existing in the juice. To this syrupy and acid liquid a portion of hot water was then added, and to this fresh slacked lime in fine powder was gradually added so as not to be in excess. It was then boiled, forming an insoluble citrate of lime. This was thoroughly washed and dried on paper. The insoluble salt of lime was then decomposed by official diluted sulphuric acid. The resulting insoluble sulphate of lime was then separated by filtration, and the filtrate of lime evaporated on a water bath until a pellicle began to form. It was then set aside for two weeks in a moderately warm place, free from much draught; at the end of this time large crystals were formed quadrangular in shape, having dihedral summits.

These crystals were analyzed and proved to be crystals of sulphate of magnesia, by which I infer that the lime used contained magnesia.

Six ounces more of the fruit was bruised and expressed as above, and the resulting liquid was set aside in a moderately warm place for three days; at this time the juice had commenced to undergo a fermentation, during which the mucilaginous substance separated, and from which the pure juice was poured off and filtered. The resulting juice measured two fluid ounces; three and a half fluid drachms of this juice were exactly saturated by half a scruple of bicarbonate of potassa, this result shows that the juice of the cranberry contains about one-half as much citric acid as the juice of the lemon; as it requires one scruple of bicarbonate of potassa to saturate the same quantity of lemon juice.

Cranberries vary very much in their yield of juice, owing to the time they are gathered, and the condition in which they are kept. When the fruit is fresh and entirely ripe, they will yield from one-half to two-thirds of their weight of juice.

Estimating from results, the cranberry juice contains 3.174 per cent. of citric acid, a large amount of gum, pectin, coloring matter, and a small amount of grape-sugar.

An experiment was next made with the cranberry seeds. 81 grains of the seeds were first experimented upon, these were dried and finely powdered, then firmly placed in a glass test tube with sufficient opening at the lower end for the liquid to pass out, 95 per cent. alcohol was used as the menstruum, taking out all the coloring and extractive matter, which was of a blood-red color, having a peculiar sweetish taste.

This liquid reacted as follows:

Liquor ammonia instantly changed it to a green, basic acetate of lead gave a copious green precipitate to the liquid in a very diluted form; nitrate of silver changed it to a brown.

The powdered seeds which had previously been treated with alcohol, were then treated with hydrated ether, by which a fixed oil was obtained, having a bland sweetish taste. This oil is of a beautiful greenish yellow color, much resembling that of olive oil, in appearance. Its specific gravity is .97, insoluble in alco-

hol, cold or hot, soluble in its own weight of ether, solidified by the mineral acids.

The skins were next experimented upon, half an ounce, previously dried, were finely powdered, moistened with strong alcohol, placed in a percolator, and exhausted with strong alcohol (95 per cent). Six fluid ounces were sufficient to entirely exhaust the skins. This liquid was of a deep red color, slightly acid. To this, water was added, which immediately threw down a copious dirty, yellow precipitate; this was collected on filtering paper, washed with boiling water, dried on bibulous paper, and pulverized; its weight was ten grains. This substance is soluble in chloroform, soluble in oil of turpentine, readily soluble in fixed oils, soluble in strong alcohol at 175° Fah.—fuses at 130° Fah., and combines with the caustic alkalies to form soap. From the results of these experiments I infer the substance obtained to be wax.

The mother liquor was treated with boiling water, which again caused a precipitate; this, when collected, washed and dried, as above mentioned, was of a greenish color, fusing at 120° Fah., soluble in boiling alcohol, soluble in chloroform, but nearly insoluble in the fixed oils, after fusion, and saponifiable by the caustic alkalies. I infer by these experiments that this substance is also a wax, but differing somewhat in its qualities from that first obtained.

The mother liquor, which had been previously treated to separate the wax, was treated with subacetate of lead, which threw down a copious precipitate.

From the results of these experiments I conclude the cranberry (as a whole) contains citric acid, gum, a fixed oil, extractive matter, vegetable albumen, coloring matter, grape-sugar, and wax.

ON MEDICINAL COMPOUNDS OF IRON WITH ALBUMEN.

By EDWIN R. SMITH, of Monmouth, Ill.

The services of the potent and beautiful science of chemistry to the science of medicine are inestimable. Its rapid progress has caused opinions to explode, errors to perish, and discoveries

of truth to enlarge the limits of knowledge, until *now* man looks through surrounding phenomena out into the infinite of truth. He reads the laws of organized life, unravels a mystery in every plant and mineral, finds a remedial agent in almost everything.

Among the numerous remedial agents added by chemical science to *Materia Medica*, there are few, if any, possessed of more worth and interest than the preparations of the useful metal *iron*. Physiological chemistry having shown this element *iron* to be an essential in the composition of the human system, skilful chemists have endeavored to prepare ferruginous preparations adapted to supply its deficiency to the organism occasioned by disease. And they have met with the happiest results; for the chalybeates are among the most numerous and valuable of all the medicines. Yet, satisfactory as this class of preparations is, additions are constantly being made to it. The most recent one proposed is by the writer Angelico Fabri, namely, "Albuminate of Iron and Soda." Our attention being attracted by this somewhat novel therapeutic agent, I made a series of varied experiments, with a view of ascertaining its character, the nature of the writer's formula, and producing, if possible, an improved formula. The results of our investigations were to find the process given for "Albuminate of Iron and Soda" faulty, and to produce formulæ for albuminate of iron and soda, albuminate of iron and potassæ, and albuminate of iron, soda and potassa, all of which I briefly note in the present essay.

The formula given by the writer referred to for "Albuminate of Iron and Soda," is as follows;—

" Take of Sulphate of Iron, grs.	104
Caustic Soda,	" 112
Whites of Egg,	4
Lime Water,	
Carbonic Acid, each q. s.	

Dissolve the sulphate of iron and caustic soda separately in a sufficient quantity of water, and pour upon whites of eggs previously beaten up; shake together, and pour upon a filter to separate hydrated oxide of iron, which will be precipitated. To the filtered solution add lime water, to decompose sulphate of soda

formed by the decomposition of sulphate of iron by the soda present in excess, by which an insoluble sulphate of lime is precipitated, which latter is separated by a second filtration. Subject the filtered solution to a stream of carbonic acid, to form an insoluble carbonate of lime, with lime present, and again filter. Finally, evaporate the mixture in a wide shallow vessel until reduced to a pint." Now, while the process given is a legitimate one, I find by experiment that it has objections, which are briefly as follows: to wit, (1). Difficulty of separating in the first filtration the precipitated hydrated oxide of iron, because of its gelatinous character. (2). Liability of using an excess of carbonic acid rendering the insoluble carbonate of lime formed soluble. (3). Tendency of the sulphur in white of egg to become sensible, by the gradual oxidation of the iron, it combining with albumen as peroxide. (4). Great length of the process, consequent on variety of manipulation. (5). The resulting compound is not permanent.

Now, I endeavored, by a variety of interesting experiments, to effect the combination of iron with albumen, in such a manner as to be free from the objections mentioned. And I now, give as the final result of my experiments the following formulæ, founded on converting iron into sesquioxide, albumen playing the part of an acid, and uniting with it only as such:—

Albuminate of Iron and Soda.

Take of Sol. Tersulphate of Iron, 1 fluidounce.

Pure Caustic Soda, 75 grains.

Whites of Egg, 3

Water, 4 fluidounces

Syrup q. s. to make 12 “

Thoroughly mix the whites of eggs with half of the water—2 fluidounces—and add to the mixture the solution of tersulphate of iron. Then add the caustic soda previously dissolved in the remaining portion of the water—2 fluidounces—with constant stirring, which will gradually dissolve the precipitate formed by the ferruginous solution. Finally, pour on a muslin filter, and add syrup to the filtered solution till the measure of twelve fluidounces is attained, and mix them.

Albuminate of Iron and Potassa.

Take of Sol. Tersulphate of Iron, 1 fluidounce.

Alcoholic Potassa, 72 grains.

Whites of Egg, 3

Water, 4 fluidounces.

Syrup, q. s. to make 12 “

Prepare by the same process as that given for albuminate of iron and soda, substituting the alcoholic potassa in the place of the caustic soda.

Albuminate of Iron, Soda and Potassa.

Take of Sol. Tersulphate of Iron, 1 fluidounce.

Pure Caustic Soda,

Alcoholic Potassa, each 36 grains.

Whites of Egg, 3 “

Water, 4 fluidounces.

Syrup, q. s. to make 12 “

Prepare by the same process as that given for albuminate of iron and soda, substituting for the caustic soda the two alkalies, soda and potassa.

Properties.—In each case the result is a syrupy, saline chalybeate solution, containing about five grains of the albuminate, with an excess of albumen, and the alkali soda or potassa, or both as the case may be. It will also be readily seen by reference to the formulæ, that the “Albuminate of Iron and Soda” will contain a small proportion of sulphate of soda, the “albuminate of iron and potassa,” a small proportion of sulphate of potassa, and the “albuminate of iron soda and potassa,” a small proportion of both sulphate of soda and potassa. The first preparation is of a beautiful orange-yellow, and the other two of a bright Maderia wine color; and the chemical combination of each compound, such that no reaction is produced on them by one of the most delicate tests for the persalts of iron, namely, the ferrocyanide of potassium, unless an acid be previously added to the soluble albuminate.

Merits.—Lecanu, Quevenne, Mitscherlich and others, have shown by chemical analysis, and a vast number of experiments, that the blood contains among other things, albumen, potassa

and iron; that the latter exists in the form of the sesquioxide of the metal, and that its presence is not demonstrated by the ferrocyanuret of iron, until the addition of an acid to the blood has been made. Besides, that the probabilities are that the mode in which iron enters the system is by albumen uniting with its salts in the stomach, forming compounds which are dissolved by the gastric acids, and thus the chalybeates taken into the stomach enter the circulation. Hence, merits, as therapeutic agents, are presumed to belong to the ferruginous preparations herein alluded to; for in them, as in the blood, we find albumen, alkali in excess, and iron, forming a chemical compound so powerful as not to be destroyed by the most delicate reagent.

I regret that limited time and acquaintance has prevented me from ascertaining whether practice would corroborate the theory advanced. I am only able to say that the effects of a number of ordinary medicinal doses of these preparations, upon my own system, were such as to induce me to believe them exceedingly nutritive and readily assimilated. This fact indicates, in a measure, that in the combination of iron with albumen, insolubility, the great difficulty with a majority of the ferruginous compounds, is overcome, and solubility, the essential to their activity, attained.

These preparations have the further advantage of not blackening the teeth or tongue, being devoid of inky flavor, and having little, if any, astringency.

The processes adopted in preparing the solution of tersulphate of iron, pure caustic soda and alcoholic potassa, I have omitted, they being those of standard authors.

HISTORY OF THE ORGANIC RADICALS.

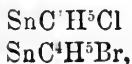
By M. AUGUSTE CAHOUS.

A Lecture delivered before the Chemical Society of Paris, March 30th, 1861.

Translated from the French, by W. S. W. RUSCHENBERGER, M. D., U. S. N.

(Continued from page 109.)

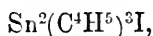
We obtain in this way the chloride and bromide of stannethyl,



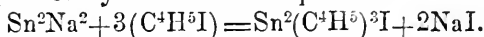
compounds which crystallize in magnificent colorless prisms; isomorphous with the iodide.

The oil with the odor of mustard, which is formed in quantities scarcely appreciable when we make use of pure tin, may be obtained in considerable proportions, if we substitute alloys containing from 8 to 12 per cent. of sodium, taking care to interpose besides an excess of iodohydric ether. When the alloy contains but from 4 to 5 per cent. of the alkaline metal, there is formed simultaneously the solid and crystallizable iodide, as well as the strongly smelling liquid compound. With alloys of from 10 to 12 per cent. the latter is formed almost exclusively.

The formation of this product, to which analysis assigns the formula



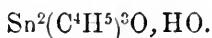
may be explained by means of the equation



This liquid compound, abandoning its iodine to the salts of silver to form crystallizable and perfectly definite products, may be, as well as the solid iodide, considered as the iodide of a new radical which we shall designate under the name of *sesquistannethyl*.

A dilute solution of potassa or of soda, occasions no precipitate in the solution of this product; introduced into a distillatory vessel with a concentrated ley of potassa, or better, with fragments of hydrated potassa slightly moistened, and the mixture warmed, we immediately see condensed in the recipient with aqueous vapor a heavy oily matter, which, on cooling, concretes into a colorless mass formed of inter-crossed prisms.

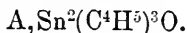
This substance, which crystallizes readily, and whose pungent odor recalls, although in a less degree, that of the oily iodide, is nothing but the hydrate of an oxide corresponding to this iodide, the composition of which may be expressed perhaps by the formula



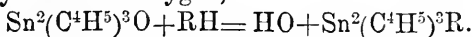
Distilled upon anhydrous barytes, it abandons its equivalent of water to yield a limpid volatile oil, which is the anhydrous oxide. If water is added drop by drop to this oil, the mixture heats and immediately concretes, producing the crystallized hydrate.

This oxide, which turns the syrup of violets green, and restores

to blue red tournesol paper, after the manner of alkalies, saturates the strongest acids, and forms salts, for the most part soluble, which readily crystallize, and furnish specimens of great beauty. These salts, which are generally volatile, and, when heated, yield an odor analogous to that of the free base, are represented by the general formula

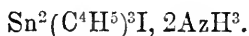


The hydracids behave towards the oxide in the same manner as towards oxygen bases, giving rise to water and to compounds which differ from this oxide only in the substitution of the radical of the hydracid for oxygen,



The chloride and bromide are liquids like the iodide, and are concreted by a slight reduction of temperature, and yield a still more insupportable odor.

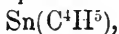
The oily iodide unites directly with ammonia, and forms a combination perfectly definite, which can be obtained in the form of magnificent prisms, by introducing into a tube, and hermetically sealing it, a mixture of the liquid iodide and ammonia dissolved in alcohol. The tube, heated in a water bath, deposits on cooling long prisms, the composition of which is represented by the formula



If we cause the iodide of ethyl to act on alloys of tin and sodium, strongly charged with the alkaline metal, and are careful to use the alloy in excess, a very brisk reaction is manifested, and, in this case, instead of having combinations of the metal with ethyl and iodine, we obtain only ethylurets.

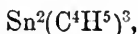
In the reciprocal action of these bodies, we obtain three distinct compounds, namely:

1st. A thick liquid decomposable by heat



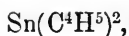
which is *stannethyl*;

2d. A very mobile volatile liquid, boiling between 240° and 250° [C.],

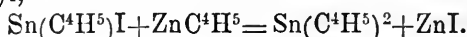


which I name *sesquistannethyl*;

3d. A very mobile, very volatile liquid, boiling between 175° and 180° , which is formed only in very small quantity,



is the *distannethyl*, which Messrs. Buckton and Frankland each obtained from the reciprocal action of zinc, ethyl and iodide of stannethyl,



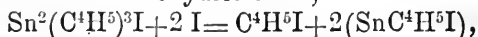
If we cause the iodide to act on the viscid liquid, we produce crystallized iodide; the action of the same body upon the sesquistannethyl cold, gives rise immediately to the formation of the oily iodide with the mustard odor; distannethyl cold produces nothing by contact with iodine. Warmed, on the contrary, a brisk reaction is manifested, and is immediately perceived by the discoloration of the liquid, the iodine being substituted in equivalent proportions, and in proportion to the quantity of iodine and to the duration of the contact, we may obtain at pleasure either the oily iodide, the crystallized iodide, or the iodide of tin.

While stannethyl and sesquistannethyl are susceptible of union directly with oxygen, chlorine and iodine, to form compounds which enter into the group

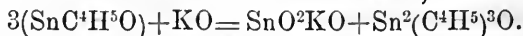


and to be eliminated from their combinations under the influence of preponderating affinities, simulate the properties of simple bodies and behave like true radicals, the distannethyl, which represents the limit of saturation, is entirely incapable of forming compounds, and can only exchange a portion of its elements to assimilate others in equivalent proportion, always preserving the integrity of its group.

We may readily pass back from the series of sesquistannethyl that of stannethyl, and reciprocally by aid of reactions which are easiest of execution. Thus by the action of iodine upon the iodide of sesquistannethyl we produce the iodide of stannethyl, with the formation of iodohydric ether,



while by distilling the oxide of stannethyl with caustic potassa, we obtain the oxide of sesquistannethyl, with separation of a part of the tin under the form of stannic acid,



The experiments of which I have just related a succinct summary, very clearly establish, that in the reciprocal action with

iodide of ethyl and of tin, compounds are formed which all belong to the group



It was important to determine the mechanical constitution of these products, and to fix their true equivalent.

Among the compounds of tin which belong to the preceding group we will cite the bichloride



Now, the determination of the density of vapor of this product by M. Dumas, demonstrating that this formula represents two volumes, it will be proper to double it, in order to make it harmonize with the best defined compounds. It will be the same with its analogue

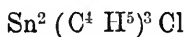


which, according to the experiments of M. Frankland, will likewise correspond to two volumes of vapor.

The chlorides of stannethyl and sesquistannethyl being susceptible of distillation without alteration, like the bichloride of tin, it at once becomes hence interesting to determine the density of these products in their gaseous form. Experiment teaches us that while the formula

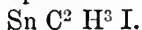


corresponds to two volumes, that which represents the chloride of sesquistannethyl



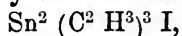
corresponds to four volumes, a constitution which should be very different, although referrible to the same group.

If we replace the iodohydric ether by the iodide of methyl, we obtain a series of products, analogous to those whose history we have just sketched. If we employ pure tin, we have formed, in considerable proportion, a solid iodide, crystallizing in beautiful sulphur-yellow crystals, melting at 30° [C.] into a limpid liquid which boils regularly at a temperature of 228° , and whose composition is represented by the formula



Besides this crystallizable iodide, there is found, though in much smaller proportion, a liquid iodide a little more volatile than the preceding, having an insupportable odor, the composi-

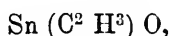
tion of which, analogous to that of the iodide of sesquistanmethyI, is represented by the formula



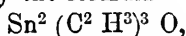
is the iodide of sesquistannethyI.

If we replace the pure tin by an alloy of this metal with sodium, taking care to employ the iodide of methyl in excess, we observe precisely the inverse, as in the case of the ethylic iodide; that is, while we obtain liquid iodide in considerable proportions, we procure but very small quantities of solid iodide.

When the solution of solid iodide is treated by alkaline liquids, there is separated a flocculent white precipitate insoluble in an excess of the reagent, the composition of which, represented by the formula



teaches us that it is the oxide of sesquistanmethyI, while the oily iodide, distilled from fragments of caustic potassa, disengages irritating vapors which are condensed in the recipient under the form of a heavy oil, which is not slow in being converted into beautiful prisms. This product, the composition of which is represented by the formula



is simply the hydrated oxide of sesquistanmethyI which presents the most perfect isomorphism with the corresponding ethylic compound. Like its homologue, it is separated by distillation on caustic barytes into anhydrous oxide and water.

The oxides of stanmethyI and of sesquistanmethyI saturate the most energetic acids, and form compounds which, crystallizing for the most part in a remarkable manner, possess properties analogous to those of ethylic combinations, and are entirely isomorphous with them.

The hydracids behave the same, and form products entirely similar.

The determination of the density of the chlorides of stanmethyI and of sesquistanmethyI, under the gaseous form, lead to conclusions, identical to those which the chlorides of stannethyI and of sesquistanmethyI furnish. It is thus that

$\text{Sn} \text{C}^2 \text{H}^3 \text{Cl}$ represents 2 vol. of vapor,
while $\text{Sn}^2 (\text{C}^2 \text{H}^3)^3 \text{Cl}$ represents 4 vol. of vapor.

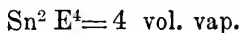
Now if we consider that the molecule of all volatile bodies,

whose equivalent can be accurately established by chemical means, always correspond to four volumes of vapor, it will be proper to double all the formulæ of the compounds of stannethyl and of stannethyl. Consequently we should formulate these different compounds in the following manner :

$\text{Sn}^2 \text{E}^4 = 4 \text{ vol. vapor.}$	Tetrastannethyl
$\text{Sn}^2 \text{E}^3 \text{Cl} =$	Chloride of tristannethyl
$\text{Sn}^2 \text{E}^2 \text{Cl}^2 =$	Chloride of distannethyl.
$\text{Sn}^2 \text{E} \text{Cl}^3 =$	“
$\text{Sn}^2 \text{Cl}^4 =$	Tetrachloride of tin ;

all these different compounds belonging to the same type.

Now the filiation which we here indicate is not purely imaginary, and the behaviour of iodine in respect to the compound

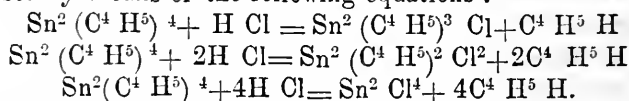


demonstrates it in the most evident manner. Indeed, if this product in excess relatively to iodine, avoiding too great elevation of temperature, an equivalent of ethyl is eliminated in the form of iodide, while there appears at the same time this oil, whose insupportable odor recalls that of mustard, and which we have denominated iodide of sesquistannethyl ; if we double the proportion of iodine and favor the reaction by the aid of heat, instead of endeavoring to moderate it by affusions of cold water, there is a separation of a second molecule of ethyl in the state of iodine, and formation of the beautiful crystallized matter to which we have given the name of iodide of stannethyl. If we use an excess of iodine, all the ethyl separates from the state of iodide, and we finally obtain the red iodide of tin. Such is the result which we obtain by warming in close vessels an excess of iodine either with tetrastannethyl, or with the iodides of sesquistannethyl and of stannethyl. From the tetrastannethyl we pass to the corresponding iodide by the simple phenomena of substitution.

The action of acids on tetrastannethyl leads to exactly similar conclusions. If we introduce into a tube a mixture of chlorohydric acid and tetrastannethyl, we observe no reaction, and even after contact of some hours at the ordinary temperature, we may withdraw from the mixture both substances perfectly intact. If these two substances are placed in a hermetically sealed tube and then heated, the tetrastannethyl is modified to an extent propor-

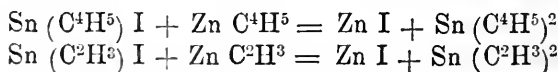
tioned to the duration of the contact. At first we obtain an irritating oil which is the chloride of sesquistannethyl, this gives place afterwards to colorless crystals which analysis proves to be chloride of stannethyl, and by still more prolonged contact we finally obtain chloride of tin.

In these different phases there is developed a gas which is no other than hydruret of ethyl; these very simple reactions, which besides agree perfectly with the preceding, may be expressed by means of the following equations :

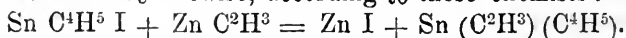


And the manner in which the iodides of sesquistannethyl and of stannethyl behave with the zinc ethyl, seems to me to completely confirm this hypothesis.

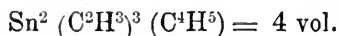
We know from the precise labors of Messrs. Frankland and Buckton that in causing the iodide of stannethyl to act upon zinc ethyl, we obtain iodide of zinc and of distannethyl, and it is precisely this reaction which led them to the discovery of this compound. And so, too, in causing the iodide of stanmethyl to act on zinc methyl, we produce distanmethyl. Indeed, we have



We would have likewise, according to these chemists :



Now I have satisfied myself that bringing together zinc ethyl and the iodide of sesquistannethyl, there is manifested a vivid reaction accompanied by the formation of an ethereal product perfectly analogous to distannethyl, the composition of which is expressed by the formula



This necessarily indicates the group



as the point of departure of these different products, which we may consider as being derived from it, by partial substitutions or by a complete substitution. The tin hence becomes a simple tetratomic radical.

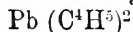
Tin in its contact with the iodides of ethyl and of methyl be-

gets, as we see, a series of products, all possessed of a simple constitution, which are referable to the preceding group. As long as the molecules of methyl or of ethyl which are joined with the tin do not exceed four, that is, as long as saturation is not satisfied, the compounds thus formed may assimilate one or two molecules of oxygen, of chlorine, acting in the manner of *true* radicals. This limit attained, the obtained product possesses, as far as relates to combination, the most absolute neutrality. These results establish, I think, quite clearly, that a body, though a compound, will always play the part of a radical, whenever, being below the limit of saturation, it is endowed with such stability that the equilibrium of its group may not be broken, either by the affinity of simple bodies with which it is put in contact, for the elements which enter into its constitution, or under the influence of forces to which it may be subjected to separate it from combinations of which it forms a part.

The iodides of distannethyl and of tristannethyl, of distanmethyl and of tristanmethyl unite with ammonia after the manner of biniodide of tin, giving rise to compounds very clearly crystallized; those which result from the union of the iodides of tristannethyl and tristanmethyl affect the form of prisms which acquire quite a large volume when we replace the dry alcoholic gas by an alcoholic solution. Aniline, toluidine, cumidine, &c. give similar results, yielding very beautiful products with ammonia.

Lead, like tin, forms with ethyl and methyl clearly defined compounds:

Plumbodiethyl



may be obtained by causing the iodide of ethyl to act upon alloys of lead and sodium, rich in alkaline metal, as M. Lœwig ascertained, or by the reciprocal action of chloride of lead and of zinc ethyl, a much more simple method employed by Messrs. Frankland and Buckton. We do not obtain in this case ethyluret of lead corresponding to the protoxide; there is separation of one-half of the metal and production of a compound which corresponds to the puce-colored [gray] oxide.

The reaction is easily explained by means of the equation.



REMARKS ON THE OLEA COCTA.

BY W. T. WENZELL.

For years the query has frequently presented itself to my mind as to the propriety of a variety of pharmaceutical preparations, the so-called Olea Cocta, as chemical analogy has led me to doubt the solubility of malate of hyosciamia in any fixed oil. To bring the subject to the test, and determine the value of these preparations as remedial agents, the following experiments were instituted to show how far my surmises were from being correct: Two ounces of *Foliae hyosciami* were beat up in a mortar with two ounces of alcohol, then introduced into a bottle, the oil added, and digested with a gentle heat about twelve hours, frequently shaking the bottle. Then the contents of the bottle were transferred to an evaporating dish, and heated at an elevated and carefully regulated temperature, till the spirit was driven off. The oil after filtration was heated with dilute hydrochloric acid, shaking it for some time. It was then passed through a filter previously moistened with water, and the obtained filtrate concentrated by evaporation. On testing the solution with phospho-molybdic acid, solution of iodo-hydrargyrate of potassium, and infusion of galls, no precipitate was obtained. Having thus failed to obtain evidence of the presence of hyosciamia in *oleum hyosciami coctum*, the mark left after expressing the oil after filtration, was next made the subject for investigation. This was also digested with dilute hydrochloric acid, filtered and concentrated, when of the several reagents above mentioned, each gave a voluminous and characteristic precipitate. Furthermore, a concentrated alcoholic solution of the leaves was mixed with olive oil, and then heated to expel the alcohol. The oil readily dissolved the chlorophylle and the odorous substance, but there appeared floating along the sides of the dish a white and apparently crystalline substance. The oil was therefore filtered, and the contents of the filter subjected to the action of warm dilute hydrochloric acid. The filtrate gave voluminous precipitates with the above reagents, and on concentrating a part of the solution, then adding bichloride of platinum and a mixture of ether and alcohol, the crystalline double chloride of platinum and hyosciamia instantly subsided. From these ex-

periments it may be inferred, that the preparation the subject of this paper does not possess the medicinal quality which it was supposed to contain; and that, unless some other solvent be employed (perhaps oleic acid,) with better success, the olea cocta must eventually fall into merited neglect and final disuse.

La Crosse, Wisconsin, April, 1863.

GLEANINGS FROM THE FRENCH JOURNALS.

BY THE EDITOR.

Cholesterin in Peas.—M. Bencke has ascertained that this animal principle, usually found in the biliary secretion, exists in young plants, the seeds of many plants and in olive oil. Five pounds of peas furnished about 20 grains of cholesterin. The peas were bruised, extracted with alcohol, the alcohol evaporated, the soft extract treated with water at 100° Fah., and the watery solution boiled with oxide of lead till the solution on standing becomes limpid. The deposit is collected and treated with boiling alcohol, the alcoholic solution treated with sulphuretted hydrogen, when, after standing 24 hours, it deposits cholesterin, which requires to be recrystallized from hot alcohol.—*Jour. de Chim. Méd.*

On the Preparation and use of Crystallized Hyposulphite of Lime.—M. J. Laneau, the Pharmacien in chief of the Hospital of St. John, in a communication to the *Journal de Chimie Médicale*, speaks of the recent suggestions of Dr. Polli, of Milan, and Dr. Jansses, of Brussels, in reference to the use of hyposulphites in diseases due to a morbid ferment. The latter physician has continued the remarkable observations of his Milanese confrère in a pharmaceutical direction, by the aid of M. Laneau, who gives the processes he used.

Hyposulphite of Lime.

Take of Flowers of Sulphur	1000 parts
Quick Lime	400 “
Rain Water	4000 “

Slack the lime with sufficient of the water, add the sulphur and the remainder of the water, and boil the mixture during an

hour and a half, adding water to preserve the measure, then, when cool, filter through white linen on which a double sheet of filtering paper has been spread, and wash the residue with 1000 parts of water, by which a solution of polysulphide of calcium of sp. gr. 1.141 is obtained. Into this a current of washed sulphurous acid gas is passed by means of a suitable apparatus until the solution is decolorized; the excess of sulphur which has been precipitated, when washed and dried, may be used as precipitated sulphur. The clear solution of hyposulphite of lime is now to be carefully evaporated by a heat not exceeding 140° Fah. (otherwise the salt will be decomposed,) until it commences to crystallize, when the solution is set aside. The yield is 700 parts of hyposulphite of lime in hexihedral crystals, which effloresce in dry air.

M. Laneau also prepares hyposulphite of lime from the *sulphite* of lime by digesting at a temperature between 120° and 140° Fah. 150 grammes of sulphite of lime, 40 grammes of washed sulphur and 500 grammes of distilled water during 24 hours, or more, if necessary, and then filter and proceed as before.

Pure hyposulphite of lime may be mixed with powdered sugar and aromatics without change. The mixture retains its dry state even in a humid air, but the author thinks sugar of milk on the whole is a better excipient for the administration of this salt in powder.

M. Laneau has made various pharmaceutical mixtures of the *hyposulphite* of lime and soda with hyposulphite of lime and sugar without any apparent chemical change occurring, and he believes that these salts may be used together if required in tubercular disease. The following formulæ are offered.

Syrup of Hyposulphite of Lime.

Take of Crystallized hyposulphite of lime	10 grammes.
Distilled water	20 “
Syrup of Orange flowers	170 “

Dissolve the salt in the water and mix with the syrup.

This syrup has a cool and agreeable taste; its bitterness is slight and easily masked by aromatics, and it keeps a long time.

Tablet of Hyposulphite of Lime.

Take of Hyposulphite of Lime	10.0 grammes
Gum Tragacanth	1.0 “
White Sugar	188.8 “
Essence of Neroli or mint	10 drops

Mix the powders, make a mass with q. s., water and the essence, and divide into tablets of one gramme each.*

On a chemical process for the decortication of seeds.—M. Lemoine, *Pharmacien*, has made known a very curious process of great practical importance, for the decortication of seeds. Seeds in general, and some leguminous and grass seeds in particular, are decorticated by mechanical means slow and expensive. M. Lemoine having asked himself whether chemistry did not furnish a simple and economical process, has applied the disorganizing action which sulphuric acid exercises on the cortical integuments to this purpose. Taking wheat, for example, he operates thus:—In a wooden tub he puts 200 pounds of wheat, and throws over it 30 pounds of sulphuric acid, 66 Baumé, and stirs the mixture during 15 or 20 minutes; when 100 pounds of water is added, which is uninterruptedly agitated with the grain for some instants and then decanted.

This first washing liquid is reserved for other uses. After sufficient washing, and the neutralization of the last traces of acid by a solution of carbonate of soda or potassa, the wheat is thrown on coarse meshed cloth stretched on a frame, where in less than an hour the seed is sufficiently dry to be taken in the hands without its adhering to it. In this state it is transferred to other frames in well aired positions, where the desiccation is effected spontaneously in several days.

The decortication of rye and oats may be effected in the same manner, but for barley it is necessary to employ an intermediate gentle heat, which effects more promptly the carbonization of the envelopes.

The seeds of *Croton tiglium*, sunflower, beans, lentils, peas, etc., are also treated with heat, and in less than twenty-five

*ERRATUM.—The word “*hyposulphite*” in italics in line 11th from the bottom of page 224, should read *hypophosphites*.

minutes the testaceous envelope which covers them is completely destroyed, or sufficiently disaggregated to be removed by washing.

Castor oil seeds present some practical difficulties that a longer experience will doubtless dissipate.

Nuts, filberts, bitter and sweet almonds, ground nuts and flax-seed, are treated cold with remarkable facility.—*Jour. de Phar.*

Substances which should neither be heated nor melted in platinum crucibles.—According to Dr. Hager, the following operations cannot be performed :

1st. The fusion of alkaline sulphurets, as well as the reduction by charcoal of sulphates of the alkalies and alkaline earths.

2d. All operations which produce the disengagement of chlorine, bromine, iodine and fluorine ; consequently it cannot be used for aqua regia.

3d. All operations which involve the separation of silicic acid, which at a red heat acts on platinum and renders it brittle.

4th. The fusion or heating of nitrates, especially those of the alkalies and alkaline earths.

5th. The heating to redness of the caustic alkalies and alkaline earths.

6th. The fusion of metals, especially those very fusible, as lead, bismuth, tin and cadmium, and particularly when a red heat is used to reduce metallic oxides.

7th. Heating to whiteness metallic oxides, which give up oxygen at a high temperature, as for example, the oxides of lead, bismuth, nickel, copper, etc.

8th. The heating of phosphoric acid and the acid phosphates with carbon or other deoxidizing agents, because of the tendency to eliminate phosphorus which acts on the platinum :—*Jour. de Pharm., Mars, 1863.*

Subnitrate of Bismuth as a disinfectant. By M. Reimslagh.—The subnitrate of bismuth, employed in fine powder on the surface, afterwards acts at the same time as a *cicatrizant* and a disinfectant.

It succeeds particularly on suppurating wounds, presenting a weak tendency to cicatrization. A thin layer of the powder (two or three millimetres) is put on the wound, and kept in its place with a piece of wadding or adhesive plaster. The wound

soon assumes a better aspect, and healing is not slow to manifest itself.

M. Riemsлагh has also used this agent in the cases of specific and scrofulous ulcers, when the cicatrization was soon complete.

The disinfecting power of subnitrate of bismuth is not less decided. It is sufficient that only one application of this powder be made, to observe the next day the fetid odor of the ulcer completely disappearing.—*Jour. de Pharm. Mars*, 1863.

Oil of Indian Hemp.—M. Grimault recommends the following formula for using this medicine externally :

Take of the Tops of Indian Hemp, finely bruised, two pounds.

Oil of Hemp Seed, four “

Mix them, and digest with the aid of a water bath during five or six hours, until the oil has assumed a deep green color, which indicates that the hemp resin has been dissolved. Then express the oil under a press and filter for use.

The stalks and lower leaves of the hemp should be rejected, as they contain little if any of the active resin, which is secreted in the parts near the organs of reproduction.

The dose of this medicine as an *external* application is a tablespoonful, which is applied over the painful parts in rheumatism, by a gentle anointing, when the part is covered with wadding and this enveloped with gum cloth or oiled silk.—*Jour. de Pharm. Mars*, 1863, from *Bull. de Ther.*

Diuretic Wine.—M. Trousseau has proposed the following new formula for diuretic wine :

Take of Juniper berries, well bruised, 600 grains.

Digitalis, in powder, 120 “

Squill, in powder, 60 “

White wine, a pint.

Macerate during four days, and add

Acetate of Potassa, 180 grains.

Express and filter. The dose of this wine is two or three tablespoonfuls per day. M. Trousseau proposes to call this preparation “*Vin diuretique de l'Hotel Dieu de Paris*,” where he made his chemical experiments.—*Bull. Ther. and Jour. de Pharm.*

PHARMACEUTICAL NOTES.

BY WILLIAM C. BAKES.

Ferro Phosphorated Elixir of Calisaya.

A preparation under the above title has been introduced to the notice of the profession, and having met with some favor, various inquiries have been made for a formula. I submit the following as yielding an eligible preparation.

Take of Pyro Phosphate of Iron,	128 grains.
Extract of Calisaya Bark,	24 “
Sugar,	4 ounces.
Water,	2 fluid ounces.
Tinct. Fresh Orange Peel,	1 “ ounce.
Sherry Wine,	11 “ ounces.

Triturate the three first ingredients in a mortar, add the water, and, when dissolved, the other ingredients; lastly, filter through paper.

Wine of Citrate of Iron and Quinine.

For want of a uniform recipe this preparation often differs with different establishments, and to obviate this difficulty I suggest a formula which yields an article having a pleasant flavor, and each teaspoonful containing three grains of the salt.

Take of Citrate of Iron and Quinine,	6 drachms and 24 grs.
Sugar,	4 ounces.
Water,	1 fluid ounce.
Tinct. Fresh Orange Peel,	2 “ ounces.
Sherry Wine,	11 “ ounces.

Dissolve the Citrate of Iron and Quinine and the sugar in the water, add the other ingredients and filter through paper.

Suppositories.

After all that has been written concerning these applications, there seems but little room left for further comment, and I design merely to describe a very convenient arrangement for moulding them, which I have used with much satisfaction. It consists of a tin tray with a movable top, perforated with a convenient number of holes; into these are put the suppository moulds, which are made of Britannia ware; the tray is filled with

ice water, and the melted ingredients are poured into the moulds, which, being surrounded with ice water, are soon solidified, and, after an interval of five minutes, may be dropped out by tapping against a hard surface. Suppositories made in this manner are well shaped and present a smooth and even surface. To facilitate the prescribing of suppositories by physicians, some establishments have made a point of numbering them according to their composition. The following list will illustrate this method, and give some idea of the substances capable of being administered in this form.

No. 1. Butter of Cacao.

No. 2. One grain of Opium.

No. 3. Two grains of Opium.

No. 4. Half a grain of Aqueous Extract of Opium.

No. 5. One grain of Aqueous Extract of Opium.

No. 6. One grain of Opium and five grains of Tannin.

No. 7. Two grains of Opium and two grains of Tannin.

No. 8. One grain of Opium and five grains of Acetate of Lead.

No. 9. One grain of Opium and two grains of Extract Hyoscyamus.

No. 10. One grain of Opium and one grain of Ipecacuanha.

No. 11. Two grains of Opium and two grains of Ipecacuanha.

No. 12. One grain of Opium and half a grain of Extract of Belladonna.

No. 13. One-eighth of a grain of Acetate of Morphia.

No. 14. One-sixth of a grain of Acetate of Morphia.

No. 15. One-fifth of a grain of Acetate of Morphia.

No. 16. One-fourth of a grain of Acetate of Morphia.

No. 17. Five grains of Tannin.

No. 18. Ten grains of Tannin.

No. 19. Ten grains of Mercurial Ointment and ten grains of Camphor.

No. 20. One-thirtieth of a grain of Atropia.

No. 21. Half a grain of Extract of Belladonna.

No. 22. Two grains of Santonin.

No. 23. Five grains of Calomel and two grains of Santonin.

No. 24. Two grains of Acetate of Lead and half a grain of Extract of Stramonium.

No. 25. Five grains of Tannate of Lead.

No. 26. Two grains of Extract of Hyoscyamus.

It will be understood that the basic material is the Butter of Cacao, to which is sometimes added White Wax, to give it a firmer consistence, see Vol. ix. No. 1, p. 5.

EXTRACTUM CINCHONÆ FLUIDUM. (CONTAINING AROMATICS.)

As adopted for the Army Supply Table.

BY EDWARD R. SQUIBB, M. D.

A Board for revising the Army Supply Table, upon which the writer served many months ago, considered it advisable to adopt some standard vegetable tonic preparation which might be well adapted to the convalescence from typhoid and miasmatic diseases, and to the depression and debility which follows inebriety. The well established value of the Compound Tincture of Bark, (Huxham's Tincture), now abandoned for the extravagant novelities in the way of "Elixirs," "Ferrated Tinctures," and other fashionable distortions of bark, led the writer to propose the following as being well adapted to meet the indications. Calisaya Bark was preferred to the Red Bark because it contains more quinia, and is rather more uniform and accessible. The aromatics were selected for their decided character, and as among the most efficient in rendering the bark more acceptable in enfeebled conditions of the digestive organs.

The skilful management of the ingredients, and the practical details of the process, belong to Mr. John M. Maisch, now of the Army Laboratory at Philadelphia, and are creditable to his well known pharmaceutical ability.

As soon as the preparation was adopted copies of the formula and process were sent to the Surgeon General's Office, and to those who furnished fluid extracts for the army; and now, after having copied it by request eleven times or more, it appears to have become of sufficient importance to be offered for publication.

Take of Calisaya Bark, in moderately fine powder, 26½ lbs. Av.

Ginger,

Cardamom,

Calamus, all in fine powder, of each,	11 oz. Av.
Sugar, white, kiln dried,	28 lbs. 6 oz. Av.
Stronger Alcohol,	
Diluted Alcohol, of each a sufficient quantity.	

Moisten the Calisaya bark with one gallon of diluted alcohol, pack it in a conical percolator, and percolate it with Diluted Alcohol until it is exhausted. This requires about 17 gallons of the menstruum, and yields about 13 gallons of percolate.

Distil off the alcohol from the percolate, evaporate the remainder to $3\frac{1}{2}$ gallons, set it aside for 12 hours, and then decant the clear liquor from the sediment.

Mix the aromatics, moisten the mixture with 12f.5 of Stronger Alcohol, pack it in a conical percolator, and percolate it with Stronger Alcohol until it is exhausted. This yields about six pints of percolate.

Add to the percolate from the aromatics the sediment from the evaporated bark percolate, agitate them together until the sediment is dissolved, and then pour this solution upon the sugar contained in a proper vessel, and stir the mixture well. When the sugar has absorbed all the solution, apply a gentle heat by means of a steam or water bath, and then, as the mixture becomes warm, gradually add in small portions, with stirring, the clear liquid decanted from the bark sediment, being careful so to regulate the additions that the resinous matters be not precipitated. During this part of the process the heat is to be gradually increased, so that by the time the whole of the liquid is added the temperature will have reached 180 or 190°. The whole is then kept heated with stirring until it measures 46 pints, or a little less, when it is allowed to become cold. Finally, strain it through a sieve of 40 meshes to the inch, and make it measure 46 pints by adding a sufficient quantity of diluted alcohol.

Each minim of this preparation represents half a grain of Calisaya bark.

It is a turbid, unsightly preparation of a dark brown color and bitter aromatic taste. After standing, the cincho-tannates of the bark settle partially, and leave a clear, very dark stratum at the

top. It should always be shaken before use, and is often best given in a tablespoonful of wine about ten minutes before meal time. It may be alternated with preparations of iron, but should neither be mixed with them nor be taken near the same time.

The maximum dose is a teaspoonful, but it is often very efficient in doses of fifteen to twenty drops; and it should never be given in the maximum dose when the stomach is very much enfeebled or very irritable. Those conditions which require a very delicate or very light diet are rarely benefitted, and often injured by over-dosing.

Brooklyn, N. Y., March 4th, 1863.

ON THE COMPOSITION OF HYDRARGYRUM CUM CRETA.

By R. HAINES, M. B.

The composition of the Hydrargyrum cum Cretâ was brought under notice by Professor Redwood in the 'Pharmaceutical Journal' for 1860-61, p. 504; and it was then shown that this preparation invariably contained suboxide, and frequently also protoxide of mercury.

A similar course of experiments had made this fact known to me four years previously, and the results were published in the 'Transactions of the Medical and Physical Society of Bombay for 1855-56,' p. 131; but as I have had subsequent opportunities of verifying these observations, and as the publication in question is not very widely circulated, a few further remarks may not be out of place.

Attention was first directed to the subject by the constant occurrence of violent vomiting which followed the exhibition of small doses, of two or three grains only, of Hydrargyrum cum Cretâ, which had been issued from a particular depot. On the powder being brought for examination, I noticed that it had not the pure gray color of the officinal drug; the tint decidedly inclined to pink. It was boiled with water, and the solution being filtered and evaporated to dryness, a very distinct orange-brown residue remained, which gave all the reactions of oxide of mercury, showing, not only the presence of uncombined oxide of mercury, but also its decided solubility in a large quantity of

water. A weighed portion of the powder was digested in dilute acetic acid as long as anything was dissolved. The filtered solution was treated in the cold with excess of hydrochloric acid, and after twenty-four hours, passed several times through a small tared filter, until the liquid came through clear. The calomel on the filter was washed, dried, and weighed, and calculated as suboxide. The mercury in the filtrate was thrown down by boiling with hydrochloric acid and protochloride of tin, and the metal calculated as protoxide. In this way, the specimen was found to contain 3.90 per cent. of suboxide, and 6.54 per cent. of protoxide of mercury.

Another much older and long-condemned specimen of the same drug was then examined, and its appearance at once showed how greatly it was changed. The color was hardly gray at all, but a dirty pink or dull salmon color. Treated in the same way, it yielded 2.19 per cent. of suboxide, and 27.90 per cent. of protoxide. It was observed, that with the exception of a few silicious particles, the whole was soluble in the dilute acetic acid, so that all the mercury had been converted into oxide. But the figures at once show that there is a considerable deficiency of the mercury itself, which, as the drug was prepared in the Government Medical Stores in Bombay, could hardly have existed at first. The 30.09 of mercurial oxides found, is equivalent to 27.95 of metallic mercury, so that the preparation would have originally contained 27.95 of mercury, to 100—30.09 or 69.91 of chalk. But mercury with chalk is prepared with three parts of mercury to five of chalk, and 69.91 of chalk should therefore be found united to 41.95 of mercury, which, increased by oxidation in the above proportion of 27.95 to 30.09, would become 45.16. Adding this to 69.91 of chalk, we get 115.07 parts, containing per cent. 60.75 of chalk, and 39.25 of mercurial oxides, of which 36.46 would be mercury. But the specimen contained only 27.95 of mercury, so that the difference, or 8.51, which is equal to 23.34 per cent. of the original quantity of mercury, has disappeared. This sample had been kept for some years in paper.

To the inquiry as to what has become of this mercury, the most obvious answer is, that it has evaporated; and although the volatilization of this metal at ordinary temperatures in our

European climate is too minute to be appreciable, this is not the case within the tropics. Faraday has long ago shown, that at temperatures exceeding 60° F., or even 50° , a sensible amount of mercurial vapor is formed; but at the ordinary temperatures in Bombay, from 80° to 90° , this volatility is much more decided. A piece of gold superficially whitened with quicksilver, reacquires its yellow color in a few days; and, what is more to purpose, I have frequently seen a few grains of fresh grey powder, folded in paper in a thin layer, to have become perfectly white in a week or two from the escape of the whole of the metal. This increased volatility, at once, I think, explains the loss of mercury in the above specimen, and the rapidity and completeness of the oxidation, both effects being further facilitated by the extreme state of division to which the metal is reduced. In the Government Stores, the process of preparing it occupies often as much as six weeks or two months; the trituration, which is effected in large marble mortars, being carried on for an hour or two a day, as the workmen have leisure from other employments.* I examined some which was still under trituration, having been six weeks in the mortar, and found already .92 per cent. of suboxide, but no protoxide. A sample from the stock in the stores, kept in glass bottles exposed to daylight, yielded 3.22 per cent. of suboxide, and .50 per cent. of protoxide. Another sample gave 1.27 per cent. of suboxide, but no protoxide. A sample from a private establishment, six months in Bombay, yielded .96 per cent. of suboxide; and another from a different establishment, eighteen months in Bombay, 1.52 per cent. of suboxide; but both were free from protoxide.

In the year 1858, I was called on to examine two other samples from the stock of a large public hospital in Bombay. One sample had, in a marked degree, the dirty salmon color above described. It likewise contained no trace of metallic mercury, but of suboxide 2.16 per cent., and of protoxide 29.48 per cent. By a calculation similar to that above given, the deficiency or loss of mercury is found to be 6.22 in 100 parts, or 18.88 per

* The operation is performed only in the rainy season, on account of the ease with which, from the dampness of the chalk, the quicksilver is then killed.

cent. of the original quantity of mercury. The second sample was but slightly changed in color; it contained per cent. 3.82 of metallic mercury, 5.80 of suboxide, and 24.98 of protoxide; showing a loss of 4.06 in 100 of mercury, or of 12.48 per cent. of the original quantity of metal. This sample has been since kept in paper, and it has now acquired the marked pink tinge of the fully oxidized preparation. The metal has disappeared.

These analyses, expressed in a tabular form, may be compared with the corresponding table of Professor Redwood.

	Hg	Hg ₂ O—	HgO—		Hg	Hg ₂ O—	HgO—
1.	?	3.90	6.54	6.	?	.96	0
2.	O—	2.19	27.90	7.	?	1.52	0
3.	?	.92	0	8.	O	2.16	29.48
4.	?	3.22	.50	9.	3.82	5.80	24.98
5.	?	1.27	0				

The following conclusions given in my original report do not differ greatly from those in Professor Redwood's subsequent paper:—

“1st, that the trituration ought not to be carried beyond the point of ensuring the complete extinction of the mercury, for the long-continued trituration after that point is attained divides the metal so extremely, as to promote its too rapid conversion into oxide: 2d, that the preparation should be used in as recent a state as possible; 3d, that it should be carefully protected from the action of the light; and 4th, that the alteration in color from ash-grey to pinkish-grey, which is easily observed, affords a strong presumptive evidence of the presence of peroxide of mercury.

If, as has been shown, this preparation occurs so often in an oxidized state as to be an unsafe and untrustworthy medicine in Europe, still more is this the case in a tropical climate, and it might be well if its use, in India at least, were altogether discarded. A mixture of calomel and starch would probably form the best substitute; and if color were an object, a careful addition of *Æthiops mineral* or lamp-black would at once impart to the mixture the well-known grey tinge.—*Bombay, Nov. 11, 1862.*—*Lond. Pharm. Jour. Feb. 1863.*

RECENTLY INTRODUCED PREPARATIONS OF IRON.

Mr. Harry Napier Draper gives (*Dublin Med. Press*, Dec. 31, 1862) the following account of three recently introduced preparations of iron :—

1. *Ferri et Quinæ Strychnicæque Citras*. Citrate of quinia and iron with strychnia.

Preparation.—Citrate of iron and quinia . 980 grs.
 Crystallized strychnia . 10 “
 Citric acid . 10 “
 Water . 10 fluidounces.

In nine ounces of the water dissolve the citrate of iron and quinia, and having dissolved the strychnia and citric acid in the remaining ounce by boiling, mix the solutions, evaporate to a syrupy consistence, and spread on plates to dry in scales.

Physical characters.—Exactly similar in appearance to the citrate of iron and quinia. Its taste is, however, more persistently bitter than that of this salt.

Chemistry.—This compound contains in each 100 parts, one part of strychnia, twenty parts of quinia, and seventy-nine of citrate of iron. The presence of strychnia may be detected in the residue from the evaporation of the chloroformic solution of the alkaloids by the usual color tests.

Physiological action and therapeutical use.—Where the use of is not contraindicated, this salt and the one next to be described, furnish perhaps the safest, if not the best, means of exhibiting strychnia. Five grains contain one-twentieth of a grain of strychnia.

Dose.—From two to five grains.

2. *Ferri et Strychnicæ Citras*. Citrate of iron and strychnia.

Preparation.—Citrate of iron 980 grs.
 Strychnia 10 “
 Citric acid . . :10 “

Proceed as in the case of the preceding preparation.

Physical characters.—Indistinguishable in appearance from the simple citrate of iron. Taste: acid, ferruginous, and persistently bitter: deliquescent.

Chemistry.—A combination of citrate of iron with citrate of

strychnia ; 100 parts contain one part of strychnia. The presence of strychnia may be detected by treating the dried and powdered salt with chloroform, evaporating and applying the usual tests.

Physiological action and therapeutical use.—This salt has been successfully employed in dyspepsia arising from atony, in chorea, and in suppressed menstruation.

Dose—Three to six grains.

3. *Ferri et Zinci Citras.*—Citrate of iron and zinc.

Preparation.—Citrate of sesquioxide of iron 4 ounces.

Carbonate of zinc 1 ounce.

Citric acid 3 ounces.

Solution of ammonia } A sufficient quantity.

Water

Dissolve the citric acid in ten ounces of water, and add the carbonate of zinc gradually. Before the point of saturation is attained the solution will deposit the citrate of zinc as an insoluble powder. This is to be collected on a filter, and having ascertained by drying a weighed portion of the mass at 212° how much is equivalent to one ounce of dry citrate, this quantity is to be heated in a capsule with the citrate of iron and ten ounces of water. When the iron salt is dissolved, enough solution of ammonia is to be added to effect solution of the citrate of zinc, an excess of ammonia being avoided. The whole is now evaporated to a syrupy consistence, and spread on glass to dry in scales.

Physical characters.—Brownish-green scales. Taste ferruginous and slightly “metallic.”

Chemistry.—This salt contains in addition to the citrates of iron and zinc, ammonia, and would therefore be more properly named ammonio-citrate of iron and zinc. Its composition as found in commerce is very variable.

Physiological action and therapeutical use.—This salt is occasionally employed as a tonic in cases where the use of iron is not contraindicated. As an elegant form of administering zinc it is worthy of trial in diseases of the nervous system.

Dose.—Two to five grains.

Am. Jour. Med. Sci., April, 1863, from Brit. Med. Journ.

ADULTERATION OF WAX.

BY BARNARD S. PROCTOR.

Wax, both in its bleached and unbleached conditions, is much subject to adulteration, so much so, that the purity of foreign yellow wax is always considered as very doubtful, and the *impurity* of white cake wax is generally looked upon as almost certain. The foreign matters fraudulently occurring in either variety may be divided into two classes: those which are fusible or soluble in melted wax, at water-bath temperature, and those which remain solid or unmixed with the melted wax under these circumstances. The latter, being so easily detected, are much less frequently present, and require no special notice at present. Resin, fat, and spermaceti are the principal materials to be looked for in the former class. Christison and Pereira both refer to all these materials, and instruct us to examine for resin by the action of cold alcohol, which they say removes nothing from pure wax; this, however, will be looked upon with doubt, since recent analyses of wax show that one of its principles (cerolein) is soluble in cold alcohol. It constitutes four or five per cent. of the wax; it is of a greasy nature, and imparts color, odor, and tenacity, which are wanting in the other two constituents (cerotic acid, the amount of which varies from 22 per cent. downwards, and myricin, which forms the great bulk of the material).

Fatty matters are to be detected, according to the above authors, by the softness, stickiness, the odor and the taste which they impart. Spermaceti, which we are informed is constantly added to white wax to improve its color, is passed over without any means for its detection being suggested; this, no doubt, arises from the analogy in the chemical characters of the two materials affording no ready means by which to recognise an admixture, and from the fact that, pharmaceutically and therapeutically, there is no great difference in the properties and value of the two.

It is a deception, however, which is only tolerated, either in pharmacy or commerce, from the difficulty of obtaining any decided results from any examination not too complicated for the purposes of the retail trader.

A close attention to the physical properties of the sample probably affords the only means of determining its quality, which is suitable as a guide to the tradesman in making his purchases from the wholesale dealer. The following results will be found useful as a guide to the presence and probable quantity of the above adulterants. Good samples of yellow wax and genuine white block wax were melted in a water-bath, with spermaceti, pale amber resin, and lard, in various proportions, as below:—

No.	1. Yellow wax	8	Spermaceti	1
"	2. "	8	"	2
"	3. "	8	Lard	2
"	4. "	8	Resin	2
"	5. "	8	"	1
"	6. Block white wax	8;	Spermaceti	2
"	7. "	8,	{ " Resin	1
"	8. "	8	Lard	1
"	9. "	8	Spermaceti	8
"	10. "	8	"	24
"	11. "	8	{ " Lard	8 4

All these additions detracted from the hardness and toughness of the wax. The yellow wax was "improved in appearance" by all the additions; its odor was not perceptibly affected by the spermaceti; the lard gave it a slightly greasy smell; the resin was distinctly perceptible in the larger proportion, barely so in the smaller. The white wax was improved in appearance by the spermaceti and lard, but injured by the resin. The odors of the lard and resin were more readily detected in the white than in the yellow wax. In both cases the odor of lard was more readily detected by rubbing the sample upon a plaster spatula heated a little above 212° , but not so hot as to make vapors rise from the wax; the odor of the resin was very distinct when sought in this way, and not less so when the heat was raised to the smoking point.

The rough mealy fracture of pure wax is rendered finer grained, smoother, and duller, by the addition of lard or spermaceti, and becomes sparkling and more granular by the addition of resin.

Pure wax becomes kneadable at about 85° , and its behaviour, while worked between finger and thumb, is characteristic. A piece the size of a pea being worked in the hand till tough with the warmth, then placed upon the thumb, and forcibly stroked down with the forefinger, curls up, following the finger, and is marked by it with longitudinal streaks. The samples Nos. 1 and 2, when worked in the same manner, are softer, curl less by the stroke of the finger, and instead of longitudinal streaks have a granular or flaky surface. No. 3 spreads on the thumb like cerate. No. 4. is softer than the pure wax, more sticky, spreads more readily, curls less, but takes the longitudinal streaks. No. 5, very similar to No. 4. No. 6 is like Nos. 1 and 2 in consistence. No. 7, soft, sticky, and of a bad color. No. 8 spreads like cerate. No. 9, softer than pure wax, capable of being spread with the finger, curls less than pure wax, and takes a granular, mealy surface. No. 10 crumbles into a mealy condition when kneaded. No. 11 spreads like cerate. Perhaps new yellow soap affords the best comparison for the sticky feeling of the samples containing lard, and also the manner of their spreading on the thumb when rubbed.

From a comparison of the samples Nos. 9 and 10 with white cake wax, as supplied by wholesale houses of the highest reputation, I am satisfied that in many cases it is half spermaceti, and, in some as much as two-thirds spermaceti to one of wax, which is supplied to us under this name.—*London Chemist and Druggist.*

FOR TOBACCO-SMOKERS.

Ferrier, an apothecary in Paris, proposes the following method of depriving the fumes of tobacco of their nicotia, and thus rendering them harmless to the smoker.

Cotton is soaked in a very dilute aqueous solution of tannic acid, strongly expressed and dried. Of the cotton thus impregnated, a pinch is put into a cigar or pipe-holder, consisting of a tube, widened at one end, and terminating at the other in a very narrow opening. The smaller end is put into the mouth—into the other end the cigar or pipe-stem. By the passage of the smoke through the cotton, the tannic acid absorbs all its nicotia. The cotton must of course be renewed from time to time.—*Wittstein's Vierteljahrs.*

G. J. S.

ON ALUMINUM BRONZE.

Lieut. Colonel Strange has communicated to the Royal Astronomical Society some interesting observations on the use of aluminum bronze as a material for the construction of astronomical and other philosophical instruments. Col. Strange remarks that, "the qualities of most importance in instrument making are, (1) tensile strength ; (2) resistance to compression ; (3) malleability ; (4) transverse strength or rigidity ; (5) expansive ratio ; (6) founding qualities ; (7) behaviour under files, cutting tools, &c. ; (8) resistance to atmospheric influences ; (9) fitness to receive graduation ; (10) elasticity ; (11) fitness for being made into tubes ; (12) specific gravity."

Tensile strength.—The mean of experiments made by Mr. Anderson at the Royal Gun Factory, Woolwich, shows that the average breaking tensile strength of aluminum bronze is 73,185 lbs. per square inch, while that of gun metal is 35,040 lbs., the ratio being rather more than two to one in favor of the aluminum bronze.

Resistance to compression.—Experiments made by Mr. Anderson show that no effect was perceptible until 9 tons 2 cwt. per square inch was applied, when the specimen gave .006 of an inch ; on removing the weight an elasticity of .001 was observed, giving the first permanent compression as .005 of an inch. The ultimate amount of compression applied was 59 tons 2 cwt. 1 qr. 4 lbs. (132,416 lbs.), under which the specimen became too much distorted to permit of more weight being applied with any true result.

Malleability.—Mr. Anderson states that, "the qualities of this metal for forging purposes would appear to be excellent ; with the exception of the part heated to a red heat in the shade, all show that it is a good workable material under the hammer almost up to the melting point. Col. Strange adds, that there were specimens exhibited in the Industrial Exhibition, at London, which showed that the alloy could be drawn out under the hammer almost to a needle point.

Transverse strength, etc.—Messrs. Simms found by experiment that aluminum bronze was three times more rigid than gun metal, and upwards of 44 times more rigid than brass ; and,

in regard to its *expansive ratio*, they found this alloy less affected by change of temperature than either gun-metal or brass—a little less than gun-metal, and much less than brass. Its *founding qualities* are such that it produces admirable castings of any size. It does not clog the file, and in the lathe and planing machine the tool removes long elastic shavings, leaving a bright smooth surface. It can be worked with much less difficulty than steel, and notwithstanding its greater cost, the Messrs. Simms think that screws made of it would in the end prove less expensive than steel. It tarnishes less readily than any metal usually employed for astronomical instruments. It is remarkably well fitted to receive graduation, as it takes a fine division which is pure and equable, surpassing any other *cast metal* in this respect. Col. Strange remarks that in its elasticity it is said to surpass even steel, and it would therefore appear to be the most proper material for the suspension springs of clock pendulums. Regarding *its fitness for being made into tubes*, it can be soldered with either brass or silver solder; it can be rolled into sheet metal, and it can be hammered and drawn. Gun-metal does not admit of being rolled, so that hitherto the tubular portions of telescopes and other instruments have been made almost exclusively of yellow brass, an alloy very deficient in rigidity. The *specific gravity* of the alloy containing 90 copper and 10 aluminum, is, according to Messrs. Bell, 7.689, very nearly that of wrought iron.

Col. Strange adds, “it appears from these experiments, and, from the concurrent testimony of those who have given it a fair trial, that the 10 per cent. aluminum bronze is far superior, not in one or some, but in every respect, to any metal hitherto used for the construction of philosophical apparatus, and that for such purposes it may be employed in the dimensions that would be proper in the case of cast steel. All parts which would otherwise be made of steel may with perfect safety, and even advantage, be made of the new alloy, particularly such parts as bolts, and fixing, tangent, and micrometer screws. Its hardness and comparative inoxidizability point it out as peculiarly adapted for pivots, axes, and bearings. If employed for receiving the graduation of circles, the necessity for inlaying another metal will be obviated, by which two advantages will

be gained; the hammering which forms part of the operation of inlaying, and which, more or less, must cause unequal density and tension in the circle subjected to such treatment, will be dispensed with; and the effect of inequality of expansion, in the circle and the inlaid strip, will no longer be a cause of apprehension. With respect to the due visibility of divisions cut on this metal, opinions will perhaps differ, I can only say that I should be well content to observe with them."

This alloy has been selected by Col. Strange as the most appropriate metal, for the construction of the large theodolite for the use of the Trigonometrical Survey of India. The horizontal circle of this theodolite is three feet in diameter, and the effect of using this alloy will be to keep the weight of the instrument within reasonable limits, notwithstanding its possession of means and appliances not hitherto bestowed on such instruments. In the manufacture of the alloy, Col. Strange says that extremely pure copper must be used; electrottype copper is best, and Lake Superior copper stands next, giving an alloy of excellent quality. The ordinary coppers of commerce generally fail, owing, it is said, to the presence of iron, which appears to be specially prejudicial. Further, the alloy must be melted two or three times, as that obtained from the first melting is excessively brittle. "Each successive melting, up to a certain point, determined by the working, and particularly the forging properties of the metal, improves its tenacity and strength. It is probable that after several meltings there will remain in combination with the copper a somewhat smaller proportion of aluminum than 10 per cent. The present price of English-made 10 per cent. aluminum bronze is six shillings six pence per pound. This is four or five times that of gun-metal, but a much smaller quantity of the new alloy than of gun-metal will give the same strength; and when it is considered how small a ratio the cost of material bears to the cost of workmanship in refined apparatus, it will be found that even at the present price of the new alloy its cost is not prohibitory, whilst the advantages attending its use promise to outweigh the increased expenditure."—*L. E. and D. Phil. Mag.*, [2], xxiv. p. 508.

C. Tissier, Director of the Aluminum Works at Rouen, shows that one per cent. of aluminum in copper makes the latter more

fusible, giving it the property of filling the mould in casting, at the same time preventing it from rising in the mould. The action of chemical agents upon it is also weakened, and the copper gains in hardness and tenacity without losing its malleability, thus producing an alloy which has the malleability of brass, with the hardness of bronze.

In transverse strength, this alloy was found to be more than twice as rigid as either brass or copper. Tissier also finds that one part of aluminum, added to bronze consisting of 96 copper and 4 tin, gives an alloy of fine color, of remarkable homogeneity, of great hardness and malleability. During casting, this alloy does not oxydize at all, and it is therefore free from the oxyd coating with which ordinary bronze castings are covered. The transverse strength of the castings of this alloy Tissier finds to be two and a half times that of the original bronze, and that of the hammered alloy is four times as great as that of bronze. Ordinary cannon-bronze, 89 parts copper, and 11 tin, has the same transverse strength as the castings of the new alloy. In reference to the hardness, tenacity, and malleability, it is equal in these respects to aluminum bronze, made of 90 parts copper, and 10 parts aluminum, and, as it is considerably cheaper, it can with advantage be substituted for this more expensive alloy.—*Amer. Journ. Sci. and Arts March, 1863, from Polytechnisches Journal*, clxvi, p. 430. G. J. B.

ON THE INDUSTRIAL APPLICATIONS OF CRYOLITE.

This interesting mineral, which a few years since was only looked upon as a mineralogical rarity, has now become an important article in commerce. Aside from its use as a source of aluminum as suggested by Percy and H. Rose, we learn from recent articles in *Dingler's Polytechnisches Journal*, that it is now extensively employed in chemical works at Copenhagen and Harburg, for the production of caustic soda and salts of alumina.

J. Thomsen (*Ding. Jour.*, clxvi. 443) claims to have discovered in 1850 that cryolite could be decomposed by lime and lime salts, and after perfecting his process he commenced the

manufacture of soda in 1857, and in 1858 erected large works at Copenhagen which now use 40,000 cwt. of cryolite annually. The exploration of the cryolite deposit in Greenland has become so extended that another large manufactory has been erected at Harburg, and others are being put up at Prague, Selicie and Mannheim. It is estimated that these manufactories will consume from 120,000 to 150,000 cwt. (6000 to 7500 tons) of cryolite annually.

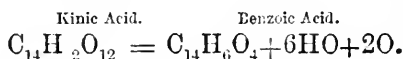
The following method is used for converting the cryolite into soda ash and alumina salts; the cryolite is first ground to a fine powder and then mixed with chalk or ground limestone, in the proportion of 100 parts of cryolite ($3\text{NaF} + \text{Al}_2\text{F}_3$) to 127 parts of carbonate of lime, equal to one equivalent of cryolite to six equivalents of carbonate of lime. This when heated yields six equivalents of fluorid of calcium, aluminate of soda $2\text{NaO} + \text{Al}_2\text{O}_3$, and free carbonic acid. An excess of chalk in the mixture is found to be advantageous, as it renders the charge less fusible. The operation is conducted in a reverberatory furnace similar to those usually employed in alkali works. The compound of alumina and soda is dissolved in hot water and subsequently decomposed by carbonic acid, which last is obtained from the furnace in which the cryolite is decomposed. The carbonate of soda solution is separated from the precipitated alumina and either crystallized, or evaporated to dryness and calcined; it affords a remarkably pure soda ash, being, of course, free from chlorides and containing only traces of sulphites and sulphates, these last due to the small amount of sulphur contained in the coke. The greater portion of this soda solution is, however, converted into caustic soda by means of lime; the commercial article of caustic soda made at Harburg contains about 75 per cent of soda. The precipitated alumina produced by the decomposition with carbonic acid, is washed with water and subsequently dissolved in sulphuric acid, yielding a sulphate of alumina entirely free from iron. (Schwarz, *Dingler's Journal*, clxvi. p. 283.) Cryolite is delivered at Harburg at two and a half Prussian thalers (about \$2) a cwt. No mention is made of the economic application of the large amount of the fluorid of calcium produced in the above operation—aside from its use for making fluohydric acid, it unquestionably can be advantageously

applied as a flux in many metallurgical operations.—*Amer. Jour. Sci. and Arts, March, 1863.*

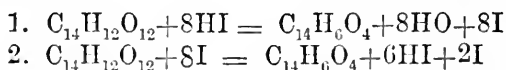
G. J. B.

ON THE REDUCTION OF KINIC ACID TO BENZOIC ACID,
AND ITS CONVERSION INTO HIPPURIC ACID IN
THE ANIMAL ORGANISM.

According to Lauteman (*Ann. Ch. u. Pharm.*, cxxv. p. 9,) when kinic acid is heated with a saturated aqueous solution of iodhydric acid in a sealed tube for two or three hours at 115 to 120° C. benzoic acid and iodine are obtained. The same conversion is effected by bringing into a retort two equivalents of iodine with one equivalent of phosphorous, and after the two have united, and the product is cold, adding to four equivalents of the crude iodide of phosphorus one equivalent of kinic acid dissolved in water to a syrupy solution. On warming gently, a vigorous reaction sets in, iodhydric acid escapes and water distils over. When the iodide of phosphorus has mostly disappeared, the contents of the retort on cooling solidify to a fat-like crystalline mass, from which ether extracts impure benzoic acid. The retort neck is also lined with crystals of this acid towards the close of the process.



The reaction may proceed according to either of the following equations.



Since kinic acid is thus converted so easily into benzoic acid, it occurred to Lauteman to examine whether it would undergo the same change in the animal organism, and appear in the urine as hippuric acid. He found this to be actually the case, in trials upon himself and two other persons, 8 grms. of kinate of lime yielding in two experiments 2.2 and 2.7 grms. of hippuric acid, respectively. Kinic acid having been proved by Zwenger and Sievert to exist in considerable quantity in the whortleberry plant, it becomes probable that it may also occur

in various grasses, and that is the origin of the hippuric acid which is found in the urine of pastured animals.—*Amer. Jour. Sci. and Arts, March, 1863.* G. J. B.

GRADUATED MEASURES.

BY BARNARD S. PROCTOR.

It is a difficult thing to get accurately graduated measures; and a difficult thing to measure accurately with them when obtained. This is a subject to which attention has been repeatedly drawn, yet there is room for a few more remarks.

Three and four ounce measures are generally graduated down to drachms and half drachms, but these smaller graduations are rarely trustworthy, even with the better class of measures; those which have the ounces correctly indicated, frequently err to the extent of 25 per cent. in the drachms.

The attraction of the liquid for the side of the measure is a source of inaccuracy in measuring; the variation thus introduced will be least when the measurement is taken from the general surface of the liquid; but measures are generally graduated for reading from the highest edge of the liquid, and if the maker and the user of the measure do not compare notes on this point, dissatisfaction is likely to result. Suppose a measure to have been graduated from this capillary edge of the water used, we may measure *water* in it with all requisite accuracy, but a *fluid ounce* of ether or chloroform will not reach up to the ounce graduation because of their deficiency in capillary attraction; and as the capillary attraction of water stands pre-eminent, all other liquids measured in the same way will be in error, and all in excess of the correct quantity. The extent of this excess will vary from fifty per cent. of the quantity measured, down to a mere nothing; when drachms are measured in a wide glass, the error is, of course, at its greatest. If makers and users of graduated glasses agreed to measure always from the general surface of the liquid, this source of discrepancy would be removed. If makers graduate from the edge, and users measure from the surface, matters are made worse; and if several circumstances conspire, we may find ourselves using one-half more of a remedy than we intend. Thus, supposing we measure from

the surface instead of the edge, suppose the graduations indicate a little more than they should, and suppose that we unconsciously held the measure a little out of the vertical, we may measure three drachms each of vin. ipecac., sp. æther nitr. and tr. camph. co., and on putting them into an ounce and a half phial, we find we have only room for one drachm instead of three drachms of acet. scilla, or whatever else may be prescribed to make up the twelve drachms.

It behooves every one who desires a reputation for accuracy to see to his measure and measuring.

The following table shows the number of *minims* (not drops) of various liquids which were required to measure one fluid drachm in a four ounce measure, in which the drachm graduation was accurately marked, measurement being taken from the capillary edge of the liquid.

Water Co. . . .	60	Chloroform . . .	80
Diluted Acetic Acid	60	Ether	77
Liq. Acet. Ammon.	60	Sp. Ammon. Co. .	75
“ “ Conc. . .	65	Sp. Vin. Rect. .	74
Liq. Ammon. .880	70	Sp. Æth. Nitr. .	72
“ “ .960	67		

The following table will also be interesting for comparison. It gives Frankenheim's results, as quoted in Miller's *Chemical Physics*, and shows the height in decimals of an inch which various liquids rise in a tube 0.04 inch bore.

Water	sp. gr.	1000 rises	0.604 inch.
Acetic Acid	“	1052	“ 0.355 “
Sulph. Acid	“	1840	“ 0.331 “
Ess. Lemons	“	838	“ 0.285 “
“ Turpentine	“	890	“ 0.266 “
Spirits	“	927	“ 0.242 “
“	“	820	“ 0.238 “
Ether	“	737	“ 0.203 “
Bisulph. Carbon	“	1290	“ 0.201 “

In conclusion, I subjoin a table showing the extent to which we may err in our measurements when several inaccuracies concur, each of which might be easily overlooked. The first column gives the quantity to be measured, the second the inac-

curacy in the graduation, the third the error introduced by measuring from the general surface instead of the capillary edge, the fourth the result of the measure being held not quite vertical, and the fifth the quantity intended to be measured as increased by the sum of these errors.

	m	m	m	Total.
f 3j.	5	18	17	5j. 40 m.
f 5j.	30	60	30	5j. $\frac{1}{4}$
f 5ij.	60	60	60	5ij. 5ij.

Chemist and Druggist, Feb. 14, 1863.

ON A METHOD OF DISSOLVING ALKALOIDS IN OILS.

By DR. ATTFIELD,

Director of the Laboratory of the Pharmaceutical Society.

Solution of Quinine in Cod-liver oil is now well known as a remedial agent. The sulphates of quinine are insoluble in oils, but the alkaloid itself is soluble to the extent of about two grains in one ounce of oil. I believe the solution is made by simply adding the quinine to the oil, and either frequently agitating or applying heat till dissolved, or by first dissolving the quinine in alcohol, adding this liquid to the oil, and then heating the mixture till the alcohol has volatilized. By either process only two grains of quinine can be dissolved in an ounce of oil, and the operations are tedious. Exposure to air and heat sets up a tendency to rancidity, the preparation frequently darkens in color, and the alkaloid is often redeposited.

On thinking over the above facts, the idea occurred to me that the *oleates* of the alkaloids, if such salts existed, would probably be readily soluble in oils. Experiment has proved the correctness of the supposition. The preparation of these compounds is exceedingly simple. All that is necessary is to bring together the oleic acid and the well-dried alkaloid and digest for a short time at a temperature not exceeding 212° . The resulting oleates are oily fluids, miscible with oil in all proportions. They are insoluble in water, but soluble in alcohol, and have no more color, odor, or taste than may be possessed by their constituents.

Solution of Quinine in Cod-liver Oil. About twice its weight of oleic acid is necessary to form a clear fluid oleate of quinine, the mixture being kept at the temperature of boiling water for

an hour or two. Its solution in cod-liver oil is not, so far as I have observed, more prone to rancidity than the oil itself, nor is any quinine redeposited from the liquid. Oleate of quinine has the consistence of a soft resin, and is perfectly stable; any quantity of it therefore may be prepared at one operation, and the product be regarded as a concentrated solution of quinine to be diluted with oil whenever necessary, and to any required extent.

Quinidine, cinchonine, cinchonidine, morphine, thebaine, narcotine, strychnine, brucine, igasurine, veratrine, atropine, piperine, and solanine, are, like quinine, slightly soluble in oil, the proportion being from one to three grains to the ounce of oil. Their sulphates and other ordinary salts are insoluble in oil, and, indeed, in oleic acid also; the free alkaloids, however, readily combine with oleic acid, forming compounds perfectly miscible with oil.

Though the above, and, doubtless, all other organic bases form definite oleates, their chemical power in this respect appears to be inferior to that of the inorganic bases; for I find that they—*i. e.* the natural alkaloids commonly met with—cannot take oleic acid from oil and liberate glycerin, as oxide of lead, potash, &c., do. About fifty grains of quinine was heated with three or four times its weight of olive oil for nearly an hour, water was then added, and the whole boiled for a short time. On evaporating the aqueous portion of the mixture, a solid, bitter residue was obtained, but it had none of the characters of glycerin. In another experiment with quinidine no glycerin was obtained. This result might be expected, for were the solution of a few grains of alkaloid in an ounce of oil anything more than a solution, were it due to combination of the alkaloid with the acids of the oil, surely the process would not stop till far more than two grains had acted upon the ounce of oil. Of course, if such exceptional alkaloids as the artificial methylic and ethylic derivatives of ammonia, the hydrated oxide of tetraethyl-ammonium ($\text{NEt}_4 \text{O}, \text{HO}$) for example, be heated or even agitated with oil, true saponification does take place. Possibly also some natural alkaloid may yet be found having sufficient chemical energy for this purpose, but the ordinary natural ones certainly have not.

Inorganic as well as organic bases appear to combine with oleic acid, and form salts soluble in oils. I find that the oxides of lead, mercury, zinc, and iron dissolve in oleic acid when strongly heated, the products being freely miscible with oils and fats. Doubtless all bases form oleates, thus affording a means whereby such preparations may be administered internally or externally in a true state of solution in oils, ointments, or liniments.

I have not yet succeeded in crystallizing any of the oleates; but the above experiments are, I think, sufficient to establish the fact of their existence, and this is a point of some slight chemical interest. The preparation of them is so simple, that, except in the case of quinine, I have given no details. But were the preparation difficult I should hesitate, to enter minutely into the matter, as at present I do not see any medical or pharmaceutical advantage in combining such substances. When competent medical men desire new combinations of remedial agents, it becomes the duty of the Pharmaceutist to apply his chemical knowledge in the preparation of them; but when supply precedes demand monopoly is too often fostered, and the *materia medica* overloaded. However important the discovery of new medicinal bodies may be, I think it undesirable to be constantly "ringing the changes" on those already well-known.

I beg to thank Mr. G. F. Wilson, F.R.S., Managing Director of Price's Candle Company, for the oleic acid used in the experiments. It is of a light yellow color, and slight but pleasant odor. It contains a small quantity of solid acid, but this is not objectionable; indeed, for such a commercial article it is remarkably pure.—*London. Pharm Journ.*

BROWNING IRON AND STEEL OBJECTS.

By M. SAUERWEIN.

Gun-barrels and other objects in iron and steel are browned, either to improve their appearance, or to preserve them from rust, by giving them at first a thin but entire coating of oxide of iron. The following process is successfully employed in Prussia for browning steel barrels:

Dissolve two parts of crystallized ferric chloride, two parts of butter of antimony, and one part of gallic acid, in the smallest possible quantity of water (about four or five parts); with this moisten a sponge or cloth, and rub the object to be browned. Leave it to dry in the air, and repeat the operation several times. Then wash with water, dry, and rub with boiled linseed oil.

Objects browned in this way have a very agreeable dead grey appearance, and the shade deepens according to the number of times the operation is repeated. It is essential to the success of the operation, that solid butter of antimony should be used,—that is to say, a chloride of antimony containing as little free hydrochloric acid as possible.—*London Chem. News*, Jan. 31, 1863, from *Dingler, Polyt. Journ.*

ON THE DETECTION OF CANTHARIDINE.

By C. R. C. TICHBORNE, Esq.

Some time since I was called upon to examine some brandy, which was suspected to have been tampered with for aphrodisiac purposes, the symptoms indicating cantharides. The suspected fluid was the remains of a glass of brandy-punch, sweetened with sugar. It was quite bright, and free from any *debris* of the flies. Now, if the flies themselves had been used, it is next to impossible that every particle of the elytræ would escape detection by the aid of the microscope; but in such a case as that given above, this conclusive test would, of course, be wanting. Desirous of investigating the subject, I performed some experiments, which proved satisfactorily to myself the ease with which small quantities of cantharidine in solution can be detected, even when mixed with large quantities of foreign extractive matter. The only process given by Taylor for the detection of cantharides is to evaporate to dryness, extract with ether, and to try the vesicating properties of the ethereal extract after evaporation. Taylor then goes on to say, that “this mode of testing is somewhat uncertain, unless the quantity be large; . . . there is, however, no other mode of discovering cantharides in solution, whether as tincture or infusion, than this.”* I also found this

* “Taylor on Poisons,” page 546.

process very unsatisfactory, which is, probably, due to the loss of the cantharidine when occurring in small quantities from the employment of heat. The chemical tests for cantharidine are too vague to admit of application, therefore we would naturally look to its vesicating properties as the best indication of its presence. The *modus operandi* that I pursued I now give, and it is extraordinary how small a quantity of the poison can be detected with certainty if the details are strictly complied with.

Chloroform is the best solvent of cantharidine that we have, and I should recommend its employment for the extraction. In the experiments above referred to, a tincture was used that represented three grains of cantharides. This was added to half a pint of wine,* and to this, which represented a suspected fluid, was added one ounce of chloroform. The whole was repeatedly shaken during the day, and left to subside until next morning. The chloroform was then carefully separated with a funnel, and passed through bibulous paper. The chloroformic solution was then allowed to evaporate spontaneously to dryness in a watch-glass. A small pellet of lint (which had previously been teased out,) about half the size of a pea, was moistened with a drop of olive oil, and with this little pellet the whole of the film of extractive matter was mopped off the watch-glass. The lint was then placed upon the arm, and covered with a piece of gold-beater's skin. When taken off in three or four hours considerable rubefaction had taken place, and after wiping it off with chloroform a large vesicle was formed. As small a quantity as one grain of flies (= to about 4-1000ths of a grain of cantharidine) was detected in solution by this means. To look for less than this in a medico-legal investigation would be useless, as this is much under a medicinal dose. The smallest dose of the tincture which has been known to destroy life was an ounce = 6 grains of powdered cantharides. In an investigation of the kind our object is to concentrate the active principle, which is diffused through an extensive medium, and bring it to bear upon a limited surface, or, in other words, to bring it to a focus. Of course, in such a manipulation, where there is so small a quantity of the principle, and which principle is in so diluted a form,

* In a second experiment it was added to half a pint of porter.

it requires to be done with the greatest care, in order to avoid loss, and to get it as free as possible from foreign matter, which might seriously diminish its activity.—*London Chemical News*, Feb. 14th, 1863.

ON THE PRESENCE OF ARSENIC IN THE SO-CALLED PURE COMMERCIAL HYDROCHLORIC ACID.—PREPARATION OF PURE HYDROCHLORIC ACID.

BY M. GLÉNARD.

So-called pure hydrochloric acid, sold by the manufacturers of chemical products, is often as arseniferous as the crude acids. Twice has M. Glénard, at a year's interval, examined numerous specimens of hydrochloric acid considered as pure. In two specimens very recently examined he found 2.5 grammes of arsenious acid per kilogramme.

According to M. Glénard, the presence of arsenic in hydrochloric acid may prove very injurious in the preparation of certain pharmaceutical products. It is, then, important that pharmacutists should be aware of this fact, and abstain from employing hydrochloric acid which they have not previously tested carefully. The examination is attended, fortunately, with no difficulty. It is only necessary to mix the acid to be tested with its volume of a solution of hydrosulphuric acid, or to pass into it, during a few minutes, a current of this gas; or, better still, to throw into it a few morsels of artificial sulphide of iron. Under these three conditions, the acid, if it contains arsenic, will become troubled, owing to the separation of the yellow sulphide of arsenic.

But how to obtain pure hydrochloric acid? M. Glénard proposes—

1. The direct preparation of this acid.
2. The purification of commercial acid.

In the direct preparation, the first step is to ascertain that the sulphuric acid is free from arsenic; otherwise, the arsenic, transformed during the preparation of the hydrochloric acid into very volatile chloride of arsenic, will escape with the acid, and with it become condensed in the water. The first thing to do is to eliminate the arsenic from the sulphuric acid. To effect

this, the acid is diluted with half its weight of water, and to it is added a little hydrochloric acid, and then a current of hydrosulphuric acid gas is passed into it. The arsenic soon separates in the form of sulphide. It is next filtered through a funnel packed with amianthus, then heated in a capsule, to expel the excess of sulphuretted hydrogen, and to bring it to 60° of Baumé's areometer. The sulphuric acid thus purified is employed in the ordinary way, and furnishes perfectly pure hydrochloric acid.

After describing the simple and ingenious process which consists in disengaging, by means of concentrated sulphuric acid, the hydrochloric gas contained in commercial acid, and in condensing this gas in distilled water, M. Glénard proposes the following method.

Into the crude acid to be purified a current of hydrosulphuric acid is passed until all the arsenic is precipitated.

The sulphide of arsenic is separated either by letting the acid stand or by filtering it through a funnel packed with amianthus. Should the filtered liquid contain excess of sulphuretted hydrogen, some grammes of a concentrated solution of perchloride of iron are added, which destroys the hydrosulphuric acid, becoming reduced to protochloride.

As the hydrochloric acid would then contain only fixed matters, it could then be rectified. Hydrochloric acid gas is displaced by means of sulphuric acid freed from arsenic.—*Lon. Chem. News, Feb. 14, 1863, from Journal de Pharmacie et de Chimie.*

ON A PROCESS FOR EXTRACTING SODA FROM CRYOLITE.

By M. J. BING.

Take eight tons of cryolite to eleven tons of chalk or calcareous stone, and pulverize separately, as finely as possible, by vertical mill-stones, and sift, still separately, through movable tammies; then mix, and re-grind by vertical mill-stones. (The portions of cryolite and chalk remaining in the tammies are again ground and sifted separately, then mixed and re-ground as in the first operation.)

The mealy powder produced in this way is placed in furnaces

constructed for the purpose, wherein it is baked and constantly stirred with iron instruments. During baking, the material must be carefully watched, to prevent it from fusing. When at white heat, it is taken from the furnace, and, when sufficiently cooled, to be sifted through an iron sifter; the lumps which may have agglutinated during the baking are separated. (After eight days, when, from the influence of the air, these morsels have lost some of their coherence, they are ground before being re-baked.)

The calcined product is sifted and put into washing-tubs, and boiling water poured upon it, until no more soda remains to be extracted. The lixivium is conveyed into reservoirs intended to receive the carbonic acid destined for the saturation. The carbonated lixivium is directed into receivers at the bottom of which clay is deposited. After clarification, the supernatant liquid is pumped, either into evaporating pans to be reduced to the point necessary for crystallization, or into calcining vessels, if salt or soda is to be produced.

Carbonic acid is obtained from the furnaces used to calcine the mixture, whence it is conducted by canals into a purifying apparatus, and thence into its reservoirs (iron cylinders; the boilers of a steam-vessel will answer the purpose.)

The operation, during which three tons of coal are burnt, produces 175 kilog. of crystals of soda and 16 kilog. of pure alumina per 100 kilog. of cryolite. Theoretically, the 100 kilog. of cryolite ought to yield 204 kilog. of crystals of soda, and 24 kilog. of alumina. The alumina is used in manufacturing alum, sulphate of alumina, aluminate of soda, or aluminium.—*Lond. Chem. News, Feb., 1863, from Rép. de Chimie Pure et Appliquée.*

[NOTE. The reader is referred to page 244 for another version of this process. We are not informed whether cryolite has been discovered in other places besides Greenland, or whether it may be economically imported from that country. As a source of both soda and aluminium it presents advantages to the manufacturer.—EDITOR AM. J. PH.]

ON THE SAGINAW VALLEY SALT REGION OF
MICHIGAN.

BY S. S. GARRIGUES, PH. D.

[Some time ago we received an extra of the "Saginaw Weekly," giving an account of the natural productions of the Saginaw Valley of Michigan, from our friend Samuel S. Garrigues, of East Saginaw, and give the following extracts from it in reference to the salt manufacture:—
EDITOR AMER. JOUR. PHAR.]

History of the Salt Discoveries.

The earliest intimations of the existence of a salt basin underlying the Saginaw Valley were given by the lamented Dr. DOUGLASS HOUGHTON, the eminent State Geologist appointed soon after the organization of the State Government in 1837. Dr. Houghton reported to the Legislature in 1838, as the result of his explorations up to that time, the discovery of many indications of salt springs on the Tittabawassee, Cass and Flint rivers and in various other portions of the State. The Legislature of 1838 passed an Act for the improvement of the State salt springs on lands donated by the General Government to the State and selected for that purpose, and authorizing Dr. Houghton to make further examinations and institute experiments to ascertain the value of these salt indications. He accordingly commenced operations on Grand River and on the Tittabawassee River, an important tributary of the Saginaw, just below the mouth of Salt river, and some 25 miles (direct) from the Saginaw river. At this place a well was bored to a sufficient depth to obtain a weak brine, but the work was suspended in the general collapse of State improvements soon after. No further efforts in the line of salt discoveries were made for some twenty years. In the mean time, evidences of the existence of this salt basin were accumulating in various ways. In the progress of improvements in digging wells in various localities, veins of water had been struck strongly impregnated with saline properties—one of them at Birch Run, midway between East Saginaw and Flint, and five or six miles from the river; dug for the purpose of supplying a saw mill with water for making steam. Individuals, however, were impressed with the belief that the saline resources of this Valley

would yet be of importance, and looked forward in firm hopes of their development at some future time. Among them was Dr. GEORGE A. LATHROP, who, with a taste for geological investigations, had become fully convinced of the existence and richness of the yet undeveloped salt basin beneath us, and his arguments and enthusiastic confidence tended greatly to inspire others with the same views. During the fall of 1858, Dr. Lathrop visited the State well on the Tittabawassee, brought home a bottle of the brine, which was evaporated on a stove, in Mr. Mott's office in this city, and a few ounces of salt produced—the embodied *prophecy* of more extensive results. Public meetings of citizens were held to take the initiatory steps toward boring for salt as an experiment. The same subject was discussed through the columns of the *Saginaw Enterprise*, the only newspaper then published in the County. Petitions were presented to the Legislature for an act to encourage the manufacture of salt by offering a State bounty; and other steps taken to initiate the work. During the session of 1859, the Legislature in compliance with the wishes of the citizens of this region and the Grand River Salt interest, passed an act giving a State bounty of ten cents per bushel for all salt manufactured within the State.

In April, 1859, the EAST SAGINAW SALT MANUFACTURING COMPANY was organized with a capital of \$50,000, under the general law of the State in regard to corporations. The stock of this Company was taken entirely by citizens of East Saginaw and parties interested in real estate here. The first Board of Directors consisted of Dr. George A. Lathrop, William L. P. Little, Charles B. Mott, William L. Webber, William F. Glasby, Dr. H. C. Potter, Jas. L. Ketcham, Moses B. Hess and George W. Merrill, of which Dr. Lathrop was chosen President. The grounds now occupied by that Company's works were purchased of Jesse Hoyt; a committee of the Board of Directors, consisting of Capt. Stephen R. Kirby, William F. Glasby, and George W. Merrill, appointed to visit the Syracuse and Montezuma salt works to learn the apparatus used and the manner of boring and tubing the wells. This committee, on their return, superintended the construction of the first tower and drilling apparatus. Operations were commenced about the first of May,

1859, and the first well was completed to a depth of 670 feet in ten months thereafter. Thus, from the inexperience of the first operators, and the various difficulties encountered, the time occupied in boring the first well was three times as long as now required. While the boring of this well was in progress—while the drill was penetrating the overlaying masses of earth and rock, to reach the treasures below—the progress of developments was eagerly watched by those engaged in the movement and others interested in the result.

The following table shows the strength of the brine obtained at various depths:

At 90 feet,	.....	1 degree.
" 102 "	.....	2 "
" 211 "	.....	10 "
" 212 "	.....	14 "
" 487 "	.....	26 "
" 516 "	.....	40 "
" 531 "	.....	44 "
" 559 "	.....	60 "
" 569 "	.....	64 "
" 606 "	.....	86 "
" 636 "	.....	90 "

Immediately after the completion of well, small quantities of salt were produced in a temporary arrangement of three or four ordinary kettles; but the erection of pumping apparatus, vats for storing and settling the brine, and blocks of kettles, took some three months longer, and the manufacture of salt as a business was commenced in July, 1860, when a block of 50 kettles was put in operation under the superintendence of Dr. H. C. POTTER, who had taken an active part in the previous operations and experiments.

The East Saginaw Company have the most extensive works of any company or firm on the river. Their first well has been continued to a depth of 743 feet, and a new well under the same roof, has been bored to a depth of 806 feet—entirely through the salt bearing rock. This well is also larger than the first one, the tubing being $4\frac{1}{2}$ inches inside; (the first one being but three inches) and a proportionate larger supply of brine is obtained. More recently the same company have sunk another well about one hundred rods further North. They have now six blocks of kettles in operation, and 500 solar vats.

Geological Formations.

In boring the wells, the drill passes through various formations of earth, mostly hard clay, sand and gravel, with occasional layers of marl, &c. Usually at a depth of about 100 feet the rock is struck. A tubing of iron is put in from the surface down to the rock, to keep it from caving in, and especially to guard against the influx of quicksand. The size of the well, above the rock, is from five to seven inches; through the rock about two inches less. As soon as the rock is struck, and sometimes before, the water brought up by the clearing pump gives indications of salt brackish taste and about one degree of strength by the salometer test. On progressing downward the salty indications gradually increase. Not always, however, in precise proportion to the depth attained, for the brine is found only in one kind of rock—a *porous sandstone*.

Various strata of overlying rocks are passed through in boring to the depths commonly required—sandstone, limestone, shales, and thin seams of coal. The salt-bearing rock is a porous sandstone. The stratum known to geologists as the *Parma sandstone*, “underlying the Woodville sandstone and coal measures” struck at a depth of about 300 feet or more in the vicinity of East Saginaw, Salina, &c., is a saliferous rock, yielding a brine of from 5 to 14 degrees. But the great depository of the saline resources of this Valley is the “*Napoleon sandstone*,” which is usually struck at a depth of about 600 feet. In order, however, to secure an ample supply of strong brine, this rock is usually penetrated from 150 to 200 feet, or a total depth from the surface of from 650 to 850 feet. The depth of the salt bearing rock varies in different localities. At the wells in the vicinity of Bay City the salt rock was struck at 100 to 150 feet less depth than those above, showing a dip of the rock south. But in the opinion of Dr. WINCHELL, the present State Geologist, the Bay City wells get their brine from the *Parma sandstone*, the same from which the weak brine is found in boring the up-river wells. If this theory be correct, the dip of the rock is to the North, instead of South; the *Parma sandstone* being reached here at a depth of 300 to 350 feet: there at 450 to 800 feet. Dr. Winchell thinks that this stratum, yielding a brine of

5 degrees at Salina and 14 degrees at East Saginaw, wells would increase in proportion to its greater depth and yield a brine of 60 to 70 degrees at or near the mouth of the river. He is of opinion that the Napoleon sandstone there lies at a depth proportionately lower than that from which they now draw their supply. This theory would seem to be strengthened by the fact that one well in that vicinity (Fitzhugh's) has been bored to a depth of 1000 feet, and yields a very strong brine, said to stand at 98 degrees.

The Salt Blocks—Process of Manufacture.

A "salt block," properly speaking, consists of fifty or sixty kettles and the stone and brick work in which they are set. The kettles are set in two rows, over two arches, reaching from the mouth or furnace to the chimney. These arches are close together, merely a dividing wall separating them and the kettles are set close together in each row. The arches, in front, are about three feet deep, the bottom gradually rising as they recede, so that under the back kettles the space is only ten or twelve inches. The front kettles evaporate much faster than the back ones. To run one block for 24 hours takes 6 to 6½ cords of wood, and from 40 to 50 barrels of salt are produced. Each block is housed under a building 75 to 100 feet long, and about 20 high in the centre, with sheds on each side containing the bins where the salt is thrown as fast as manufactured. After remaining in these bins a few days for further drainage, it is packed in barrels for market.

When the works are in operation, an engine is kept running for pumping the brine, which, although it rises to the surface in most wells, when not drawn from, requires to be pumped a distance of 100 to 150 feet. The brine is carried in pump logs to the vats or cisterns near by flowing in, fountain-like, through a spout, over the top. From these vats another set of pump logs carries the brine into the block house, and along the top of the brick work between the two rows of kettles, from which a spout extends over each kettle, in which a plug is inserted. By withdrawing the plug a few moments the kettle is readily filled.

But before proceeding further we introduce another branch

of the subject—the *strength and character of the brine, the nature of its impurities and the method of getting rid of them*; in fact, a part of the process of manufacturing.

The Brine.

The brine is stronger in saline properties than that of the Onondaga springs or any other brine in the United States from which salt is manufactured. It varies a little, though not very greatly, in the different wells—most of them running from 75 to 85 degrees by the salometer. To make this test understood by those unacquainted with it we should explain that 100 degrees means *full saturation*—as much saline matter as water will hold in solution. To take a pail of fresh water and dissolve salt in it until no more could be dissolved, would illustrate full saturation, and would measure 100 degrees by a correct salometer. The salometer therefore, tests the brine by its density or gravity, and on the same principle that a farmer making brine for his beef or pork tests it by throwing in an egg or a potato, to see when the brine is strong enough to float it. This explanation is necessary because the uninitiated are apt to imagine that 100 degrees or “100 per cent,” (the term sometimes used) means *all salt*; which is far from the truth. Of the 75 to 85 degrees of saline matter, something over three-fourths are *chloride of sodium*, or *common salt*, and less than one-fourth other ingredients, known in manufacture by the general term *impurities*. An analysis of brine from the East Saginaw Co.’s well, made by Prof. CHILTON, in May, 1860, gives the following result:

Specific gravity at 60° Fahrenheit.....	1177
In 100 parts of brine, Salometer 90° are found,	
Chloride of sodium.....	16.8710
Chloride of calcium.....	3.2873
Chloride of magnesium.....	1.7743
Bromide of sodium.....	.0401
Sulphate of lime.....	.0982
Carbonate of lime.....	.0500
Silica and alumina.....	.0245
Carbonate of iron.....	.0116
Water.....	77.8430

100.0000

In 100 parts of dry solid matter there are,

Chloride of sodium,.....	76.143
Other substances,.....	23.857

100.000

The total percentage of solid matter is 22.157

In one wine pint there is, of solid matter,

Chloride of sodium,.....	1229.72 grains.
Other saline matters,.....	385.30 "

1615.02 "

In order to dispose of these impurities, the brine is kept standing in the vats five or six days before boiling, to *settle*, (the process being facilitated by a small quantity of slacked lime thrown in,) when a dark reddish sediment is deposited at the bottom consisting of iron and other impurities. There are usually two or more cisterns, from which a block of kettles is supplied, one of them being filled and left to settle, while another, previously filled and settled, is being used. While the brine is heating after the kettles are filled, and before boiling commences, a scum rises and is taken off; and a flat pan placed at the bottom, with an upright handle in the centre, catches another portion of sediment which is drawn up, and thrown out. As will be seen by the analysis, this brine contains but a very minute quantity of *sulphate of lime*, (plaster) a very troublesome system in the Syracuse brine, where it is found in much larger proportion, clogging the kettles with a hard coating requiring picks to remove it. The deposits on the kettles here are about 60 per cent. salt, soluble and easily cleansed with fresh water.

In the Saginaw brine the only really troublesome substance is the *chloride of calcium*, a subtle, adhesive substance, which retains and gathers moisture and never becomes dry. It does not crystallize like salt, but mostly remains in the brine after the salt is dipped out, forming the principle ingredient of the "bitter waters" which are dipped out of each kettle after the salt is removed. If the bitters are not dipped out often enough and become too strong, this chloride is liable to adhere in small quantities to the salt crystals, giving them a kind of moisture requiring weeks or months to become entirely dry.

After a kettle of brine has boiled a short time, the crystals

of salt commence forming on the top and fall to the bottom. When the quantity of brine is boiled down to about one-half, the salt is dipped out with a long-handled pan and thrown into a basket standing over one side of the kettle, for drainage. The bitter water is thus drained off, carrying with it the *chloride of calcium* and other impurities. "This thorough drainage is considered the important point in our manufacture," as remarked by Dr. Potter, in a letter quoted by the State Geologist. After standing some time in the baskets the salt is thrown into loose bins arranged on either side of the block, where, after remaining some days for further drainage, it is packed in barrels for market. The bitter water remaining in the kettles is bailed out after every third or fourth drawing off of salt. If this bailing out is neglected too long, the bitters increase to such an extent that they act on the iron, rusting the kettles and coloring the salt, and are also more liable to adhere to the crystals of salt instead of passing off in the drainage. To make a No. 1 article of salt, the bitters should undoubtedly be dipped out every time the brine is boiled down. This, though expensive in the waste of brine, is the only way known to free the salt entirely from the chlorides, and will probably pay better in end.

Expense of Salt Works.

The expense of boring wells and putting down the tubing is from \$1.50 to 2.00 per foot. It is usually done by men who make it a business, and contract to sink wells at so much per foot, or at a certain price for the job, providing it does not exceed a certain depth named.

The salt wells, like other artesian wells, are bored by a drill attached to one end of a balance beam worked by steam. The drill is somewhat in the shape of an iron wedge, but made of hardened steel. It is not forced down, but being drawn up by the machinery, it falls by its own weight and the weight of rods attached, striking and chipping the rock at every stroke. The operator in attendance turns the rod around a little each time, making it strike in a different position. As the drill progresses downwards, more rods are attached. When the drill becomes obstructed by the chips or borings, it is taken up by the same rods, and the chips brought up by the pump, the valves of which

opens on striking them, and close when starting up, retaining and bringing them up. The brine from the bottom of the well, while boring is drawn up in a similar manner. When a well is sunk to the depth required, an iron tubing is put down, reaching from the surface to within a few feet of the bottom. The tubing is in pieces 16 to 20 feet long, and screwed together at the joints, and has packing around the lower section, near the end, to shut out the weaker brine from the upper strata getting mixed with the stronger brine below. This rock tubing, from the surface to the rock, is surrounded by another and larger one—the *earth tubing*, previously alluded to. The cost of tubing varies with the size. The size ordinarily used costs about \$1 per foot. The total cost of a salt well of say 750 feet depth, including tower and engine house, boiler and engine for drilling (afterwards to be used for pumping,) is ordinarily about \$4,000. For a block of 50 kettles, (weight from 600 to 850 lbs.) 3 cents per lb., average \$20 per kettle, or \$1000 in all; add \$1,000 more for stone and brick work for arches, the building in which it is situated, with salt bins, reservoirs for brine, pump logs, &c., and \$500 more for *contingents*, and we have a total of \$7,000 for a complete salt works with one block in running order. But one well will easily supply two blocks; and an additional block can be erected and the facilities for manufacturing doubled, at an additional cost of two thousand to twenty-five hundred dollars more. So that complete works with *two blocks* in running order may be estimated to cost from \$8,000 to \$9,000. This, of course, does not include the cost of the grounds, which vary according to location and fancy.

Anywhere along the banks of the river, from its mouth 30 miles upwards, or on the Cass or Tittabawassee, near the mouth, "Salt locations" may be chosen. Not that salt cannot be made as well, probably, a few miles back from the rivers, but a river front for shipment is considered almost indispensable. Numerous land-owners have platted out their land in three to five acre lots, in long narrow strips fronting on the river. Of course there is room for a great many such salt locations along the river; but, from their varying situations, vary much in value. Convenience of access by roads, for hauling wood—the expense of docking,

and other circumstances, affect the value. A location in the low marshes between Zilwaukie and Portsmouth, where the surface may be overflowed in high water, and would need filling up or docking over, at much expense, are not as valuable as on a dry and level bank. Salt locations have been sold at all prices, varying from \$100 to \$1,000 per acre. Speculators, of course, have had a finger in the business, and have generally secured a pretty large share of the first profits.

Expense of Manufacture.

The expense per barrel of manufacturing salt by the boiling process, and packing it for market, as figured up by the East Saginaw Company in November last, since the rise in price of labor and fuel, is as follows :

Labor,.....	\$0.20
Wood,.....	.35
Barrels,.....	.35
Packing, .....	.04
Nails, branding, &c.,.....	.02
National tax,.....	.11
<hr/>	
Total,	\$1.07

These figures are probably abundantly high for the coming year. The price of salt will not probably fall below \$2, during 1863, which will afford a handsome profit.

A block of kettles produces from 40 to 50 barrels of salt in 24 hours; 45 barrels is probably a fair average, and requires from six to six and a half cords of wood.

NOTES ON THE EXTRACTION AND ESTIMATION OF SOME OF THE CRYSTALLINE PRINCIPLES OF OPIUM.*

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In the year 1856, learning that there lay in the medical stores some 300 or 400 lbs. of Khandeish opium, unsaleable on account of adulteration, and for the same cause not considered suitable

* From the *Transactions of the Medical and Physical Society of Bombay.*

for issue for medical purposes, I got permission to make a preliminary trial upon it, and, having found that it would yield five or six per cent. of muriate of morphia, I made an offer to the medical board to extract all the morphia from it in the form of muriate. The offer was accepted, and I commenced operations, in the first place, upon 200 lbs.

In choosing the process to be adopted, I was obliged to have regard to the nature of the appliances at my disposal. My vessels and furnaces being but small, I preferred to avoid, if possible, great boilings and filtrations. The extraction, therefore, with a sufficient quantity of cold water, and the filtration and expression, were effected at the medical stores, though not, I fear, very completely.* The filtered liquors being collected, solution of ammonia was poured in with vigorous stirring, until a distinct ammoniacal odor was perceptible. About 1 lb. was required for every 10 lbs. of opium. The first effect of the ammonia was to precipitate a vast quantity of resin, which, by stirring, soon balled together into a tough, pitchy mass. This could be at once removed. After some hours the morphia was deposited at the bottom and sides of the vessel in distinct granular crystals of a pale brown color. The crystals, after being washed, were dissolved in hydrochloric acid, and the hydrochlorate of morphia purified in the usual way. The resinous mass I found, rather to my surprise, to contain, besides the greater part of the narcotine of the liquid, a large quantity of morphia enclosed as crystals within it. In order to utilise this morphia, I first attempted to treat the mass like the first crystals, by solution in hydrochloric acid and crystallisation; but I found that so viscid and pitchy a mass resulted that the crystals would hardly form in it. I was, therefore, driven to endeavor to get rid of the resin before operating upon the enclosed morphia. Treated with twice or thrice its weight of boiling alcohol, the resin softened and dissolved, but, as the temperature fell, the greater part separated. The spirit was poured off, and the resinous mass, while still warm and soft, was folded in strong calico, and subjected to very gradual but ultimately powerful

* The marc of this portion, and of the succeeding 100 lbs., was unfortunately not preserved, as it might have been, for the extraction of the narcotine.

pressure. An exceedingly tough black mass was very slowly forced out, and at last a light brown cake of morphia and narcotine was left in a state fit for solution in acid. Although I had carefully studied the accounts given of the various processes for extracting morphia, I had not been led to expect exactly this behaviour of the aqueous solution when treated with ammonia.

In a subsequent operation, the precipitant used was carbonate of soda. Less resin was thrown down, and the morphia was lighter in color, but not quite so abundant, and the precipitation did not appear to be so complete. The watery solutions from which the morphia had been precipitated were not thrown away, but were preserved for the operations presently to be noticed.

One reason why I adopted the above process in preference to that of Gregory was, that the results of a preliminary trial on a few pounds of opium of what I believed to be that process, had been unfavorable, for, after the addition of chloride of calcium and evaporation to a syrup, the hydrochlorate of morphia crystallised with extreme slowness and very imperfectly, so that, after standing a month, more than half the salt remained in solution, and it was at last necessary to separate the morphia by diluting the expressed fluid with water and precipitating with ammonia. In this case I followed the process as detailed in the *Edinburgh Pharmacopœia* of 1841, which, as I afterwards found, omitted one most essential step, without which, in fact, complete success is impossible. In the process as originally devised by Gregory in 1831,* the directions are to add the chloride of calcium to the concentrated liquid, and then to pour the whole into a large quantity of cold water, which causes the separation of abundance of resinous flocculi, after straining off which the liquid may be again evaporated to crystallisation. Not only is this step omitted in the *Edinburgh Pharmacopœia* of 1841, but it is omitted by Gregory himself in his "*Handbook of Organic Chemistry*." The London College, however, in the *Pharmaco-*

* I cannot find the original paper, and, therefore, I have drawn my account from Geiger und Liebig's "*Handbuch der Pharmacie*," 1843, Band i., s. 1191—a work which for fulness and accuracy cannot be too much commended.

poëia of 1836, substituting chloride of lead for chloride of calcium, does not neglect this part of the process. It is, in fact, a most essential one, for the quantity of resinoid extractive matter got rid of by this simple means is something enormous, and the liquid now freed from it leaves on evaporation a thin, aqueous syrup, which scarcely interferes with the crystallisation, instead of the tough, viscid, black mass of the former case.

The last portion of the opium, consisting of 71 lbs., was treated in this way by the chloride of calcium process, and with perfect success. The total yield of pure hydrochlorate of morphia from the first $294\frac{1}{2}$ lbs. of opium by the precipitation method was 14 lbs. 5 oz. 6 dr., or 4.87 per cent.; that of the last 71 lbs. 11 oz. of opium, 4 lbs. $1\frac{1}{2}$ oz., equal to 5.71, or nearly $5\frac{3}{4}$ per cent., after the extraction of the codeia; the increased quantity in the latter case being, perhaps, partly due to the greater care taken in exhausting the opium, which was done by myself in the College laboratory. In this way a total of 18 lbs. 6 oz. 14 dr. of hydrochlorate of morphia of the best quality has been supplied to the stores at the mere cost of a few pounds of solution of ammonia and of hydrochloric acid, and of a hundredweight of coal and charcoal.

I have tried at various times most of the processes that have been recommended for the extraction of morphia, with the exception of that of Merck,* and I have certainly found no reason to dissent from the preference universally shown by English manufacturers for Gregory's method, taken as a whole, and especially with the proviso above noticed. The substitution, by the London College, of chloride of lead for chloride of calcium has met with disfavor, partly by reason of the expense of the lead salt, and partly from the large quantity of water required to dissolve it. But I am not sure that a little modification would not remove these objections, and ensure a more abundant yield of morphia. I have been astonished to observe what an exceedingly copious dark precipitate is formed in the opium residues by solution of sugar of lead in Anderson's method, and the great clearing and thinning in the subsequent extract which results; a thinning which, in fact, has the effect of allowing the

* Geiger und Liebig's "Handbuch der Pharmacie." Band i., s. 1188.

almost immediate and copious crystallisation of one of the constituents, narcein, which, otherwise, may remain for months in solution. I would propose, then, that after the first evaporation of the watery solution, and the separation of resinous matter by dilution with water, the liquid be precipitated with a saturated solution of acetate of lead, added as long as a deposit is formed. The meconic and sulphuric acids are completely removed, with a great abundance of resinoid substances, but none of the crystalline bases. The liquid is filtered through cloth. To save trouble in washing out the bulky precipitate, the best method would be, after one or two affusions of water, to fold it in calico and squeeze out the liquid in the press, and thoroughly dry the precipitate; it may then be powdered, and the soluble matter may be readily extracted by digestion in water. The liquid being now brought to the boiling-point, a solution of chloride of calcium, equivalent in quantity to the acetate of lead used, is to be added. On evaporating the filtered liquid to a small bulk, almost the whole of the remaining lead will crystallise out as chloride, after separating which by filtration, the evaporation may be continued until the muriate of morphia crystallises. The small remaining portion of lead will be effectually got rid of in the final purification with animal charcoal. In this way all the advantages of the use of the lead salt are obtained without the expense and trouble of preparing and dissolving the chloride of lead.

In all the forms of Gregory's process a small portion of the morphia of course remains in solution in the black syrupy residue; it must be eventually extracted by diluting with water and precipitating with ammonia. Mohr's process, which consists in pouring the watery solution of opium into boiling milk of lime (in which the morphia, at first precipitated, speedily re-dissolves), filtration, evaporation to a small bulk, and precipitation with muriate of ammonia, is admirably adapted to experiments on a small scale, if sufficient time can be allowed for the thorough washing of the lime residue, and for the evaporations. I have generally found that it afforded a better yield of morphia, and in a purer form, than the other methods; but on a large scale it is not suited, I should think, to the appliances of a general labora-

tory, from the difficulty in boiling such large quantities at once, and in the filtration of the bulky mass of lime and resin.

The mother-liquors from the first 300 lbs. of opium, after precipitation by ammonia, were operated on with the view of obtaining the narcein and meconin. Not being at the time acquainted with the recent researches of Anderson,* I could only consult for this purpose the old papers of Pelletier and Couerbe, their respective discoverers.† The process described was simple in the extreme. Pelletier, in obtaining narcein, treated the mother-liquors with baryta water to separate meconic acid, and then with carbonate of ammonia to separate baryta; after the requisite filtrations, the liquid was evaporated to a syrup, when narcein crystallised after a time, and was obtained by pressing out the liquid through linen. Couerbe, to obtain meconin, omitted the treatment with baryta, and merely evaporated to a syrup, after precipitating the morphia and narcotine with ammonia: after fifteen or twenty days meconin and narcein crystallised together. Since Couerbe obtained both principles by the simpler process, and Pelletier only one by the more complex, I of course adopted the former plan. The liquids were evaporated to a syrup, and set by for a month; nothing, however, could be found—neither narcein nor meconin. But after standing for months some ounces of small hard brown crystals had formed at the bottom, which turned out to be narcein. Meconin could not be discovered. Acting on the known solubility of meconin in ether, I attempted to obtain it by shaking up the syrupy liquid with ether, and separating and distilling off the ether. There remained a small quantity of what appeared to me to be a resin, and I threw it away. I have no doubt now that it was chiefly meconin. From repeated losses of this kind one becomes at last extremely cautious in throwing away even worthless-looking dregs and residues; and the eloquent words of Sir John Herschel on the use of the residues, ever and anon recur to the mind with a full feeling of their force and truth.‡

* *Trans. Royal Soc. Edin.*, vol. xx., part iii., p. 347. Liebig und Kopp's "Jahresbericht," 1852, s. 537.

† *Ann. Chim. Phys.*, tome l., pp. 240 and 337.

‡ "Discourse on the Study of Natural Philosophy," § 161, *et ante*: "It was a happy thought of Glauber to examine what everybody else threw away."

In treating the mother-liquors of the last portion of opium, 71 lbs., the method adopted by Anderson was put in practice. The liquid was first diluted with water, and the copious deposit strained off; it was then precipitated with ammonia, which threw down, with much resin, morphia, narcotine, thebaia, and a portion of the papaverine. The filtered liquor was neutralised and mixed with solution of sugar of lead in slight excess; after filtering off the very copious dark precipitate, the excess of lead was removed by sulphuric acid, the sulphate of lead separated, and the acid neutralised by ammonia. The liquid was now evaporated to a thin syrup. In a few days it appeared semi-gelatinous, owing to the presence of a congeries of very fine silky crystals of narcein. These were separated by filtration and pressure, and re-crystallised. The liquid now contained only meconin and papaverine. It was shaken several times with ether, the ether removed and distilled off, and the resinous-looking residue boiled with water, in which it partly dissolved; meconin crystallised on cooling. I could find no papaverine in this substance.

The precipitate by ammonia was boiled with rectified spirit. After cooling, the spirituous liquid, which contained the thebaia with a little narcotine, was separated from the undissolved portion, the spirit distilled off, the residue mixed with a slight excess of acetic acid, and then thrown into a large quantity of cold water. A copious deposit of resin was formed. After filtration, basic acetate of lead was added until the liquid had a faint alkaline reaction. A copious precipitate fell, containing, with oxide of lead, resin, narcotine, and papaverine. From the the liquid the excess of lead was removed as sulphate by sulphuric acid; after filtration it was nearly neutralized with carbonate of soda, and then treated with solution of ammonia in slight excess. Thebaia, morphia, and resin were thrown down as a light brown precipitate. This was collected, dried, and powdered, boiled with spirit, filtered, the spirit distilled off, and the residue set aside in a capsule for some days. It became filled with crystals of thebaia and morphia. After pressing and re-crystallisation, the morphia was removed by digestion in solution of caustic soda, and the thebaia purified by solution in acetic acid, digestion with animal charcoal, precipitation with caustic soda, and repeated crystallisation out of alcohol.

The precipitate with basic acetate of lead was dried and boiled with spirit, the spirit distilled off, and the cooled residue, after separating the crystals of narcotine, mixed with dilute hydrochloric acid. After some days, the hydrochlorate of papaverine ought to have crystallized, but although a few crystals were observed at one time, when I was too busy to attend to them, they disappeared again, and could not be reproduced. I, therefore, varied the proceeding. The liquid was mixed with twice its volume of spirit, then with excess of caustic soda; ether equal in bulk to the alcohol was now added, and then with agitation water, until the ether separated, carrying with it papaverine and narcotine. The ether was evaporated, and the residue boiled with spirit; crystals of narcotine separated on cooling. The papaverine should now have been in the mother-liquor. This was evaporated, and a further crop of small crystals obtained, which were supposed to be the looked-for base. After they had been purified with a great deal of trouble, they weighed 20 grains; they were found, however, to be nothing but narcotine. I am inclined to think that the failure was owing rather to bad management in some stage of these complicated operations, than to the absence of papaverine in the opium.

The narcein obtained by me corresponded more closely with the description of this substance given by Pelletier than with that by Anderson. It is colored of a beautiful azure blue, by moderately strong sulphuric and hydrochloric acids, as described by the former, though the latter denies the coloration. Strong sulphuric acid dissolves it to a dark brown, almost black solution. I could not obtain the red color with sulphuric acid, described by Anderson.

(To be concluded.)

Varieties.

Acclimatization in Australia.—A New Zealand Journal, speaking of the two white swans presented by the Queen to this colony, and which were placed on the North Shore Lake, says that they were sitting on no fewer

than eighteen eggs. The swans had been hatched alternately for three weeks. One of the Canadian geese which came with the swans, and from the same royal donor, flew away some time after being placed on the lake, but the remaining bird took up with the common geese, and the result has been a magnificent cross. The divers are doing well. In Victoria, measures are in progress for the speedy introduction and acclimatization of roedeer, partridges, rooks, hares, sparrows, and song birds, from England; deer, Cashmere goats, and black partridges from India; ostriches, pheasants, and partridges, and antelopes from the Cape of Good Hope; for all of which the money has been remitted by the Acclimatization Society. A letter was recently received by the Acclimatization Society of New South Wales from Mr. Black, of Miumi, inclosing a sample of wool from an Angora goat, descended from those that were imported some years ago into this colony. Mr. Black, who has paid much attention to improving the breed of goats, states that their wool and fat are exceedingly valuable; that their flesh is in no way inferior to mutton, but rather resembling venison; that the females breed twice a year, producing generally two at a birth; that they require very little shepherding, and thrive well where nothing else could be kept with profit.—*Medical Times and Gazette*, Jan. 13, 1863.

Bleaching Shellac.—DR. SAUERWEIN (*Monatsblatt d. Gewerbever. f. Hannover*, July and August, 1863—*Chem. Centrbl.* No. 6, 1863,) recommends the following process as the most advantageous:

Twenty-five parts of shellac are dissolved in 600 parts of water together with 10 of sal soda, and the solution filtered. On the other hand, 30 parts of hypochlorite of lime are rubbed up with water, and the strained liquor precipitated by a solution of sal soda, about equal weights of sal soda and hypochlorite. The chlorinated soda liquor is diluted to 600 parts, and gradually added to the shellac solution together with some dilute muriatic acid, just sufficient not to cause any precipitation, keeping the mixture stirred. It is then exposed to the direct rays of the sun for a day or two, when the bleaching is complete. The addition of muriatic acid very materially aids in the bleaching process, but requires to be done with care. When bleached, the solution is filtered, mixed first with a little sulphite of soda (anticlore,) and then with sufficient muriatic acid to precipitate the bleached lac. The latter agglutinates on warming, is removed from the liquor and washed in pure water. The superior silky lustre is produced by malaxating it at the lowest possible temperature.—*Druggists' Circular*.

Fir Wool Oil and Fir Wool.—These preparations have for a long period been held in high estimation in Germany, where they are largely manufactured by Messrs. Schmidt & Co., of Remda, on the Thuringian forest. Some time has elapsed since their first introduction into this country, a

brief notice of them having appeared in Professor Bentley's *Manual of Botany** more than two years ago; it is, however, only recently that attention has been directed to their valuable properties. They are procured from the finer leaves of the *Pinus Sylvestris*, the Scotch fir, or Cild pine, a well-known tree belonging to the family *Pinaceæ* or *Conifereæ*—The Pine, or Coniferous order, that oil being obtained by distillation, and the wool prepared by some chemical process. The former, which is almost colorless, possesses a pleasant aromatic, pinic odor, and an aromatic, and to many, not unpleasant taste. Its specific gravity is .868; it is soluble to some extent in rectified spirit, but more readily so in ether, and burns with a sooty flame, like turpentine. It is stated to prove an unfailing remedy in cases of rheumatic and gouty affections, chalk-stones, paralytic, catarrhal, and spinal affections, chilblains, and burns. In a short notice of this remedy in a recent number, the *Lancet*† says, "As a remedy for rheumatism, it has long been approved of by the leading members of the German faculty, including Dr. Hopp, Professor of Medical Science in Basel; Dr. Paul Niemeyer, in Magdeburg; Dr. Henschkel, in Kaltennordheim; Dr. Pauly, in Fost; and Dr. Bajakowsky, in Rosenberg." It is largely prescribed in Germany at the present time, and the increasing demand for it in this country seems to promise its acquisition of a high reputation as a remedial agent.

The wadding is employed for bandaging, and is the best medium for applying the oil; it is said to be repulsive to vermin, and is employed for lining dresses, &c. A knitting yarn is also prepared from the pine leaf, which, in conjunction with other fibrous substances, is woven into articles of clothing, which are stated to render those who wear them free from rheumatic attacks. In cases of rheumatism, gout, neuralgia, and catarrhal affections, as cough, hoarseness, sore throat, and cold in the head, the suffering parts are to be moistened with from fifteen to twenty drops of the oil, and then to be covered tightly with the wadding, so as to exclude the air. A few minutes after the application, a prickling sensation or warmth should be experienced, which is a symptom that the remedy is taking effect. Should this not ensue, the application is to be repeated, and if no irritation be produced within fifteen minutes, moisten the wadding with the oil, when the desired effect will be produced. Should the prickling become painful, remove the wadding and the irritation will abate; in no case must the irritation be allowed to become too painful; and when applied to children, or where the skin is tender, it should be mixed with an equal proportion of olive oil. In cases of chronic rheumatism and gout, its internal administration in doses of from fifteen to twenty drops twice a-day, has been found beneficial. In catarrhal affections, the inhalation of the vapor from ten drops of the oil poured into hot water, and the use of a warm foot-bath containing about thirty drops of the oil, will be found beneficial

*Page 659.

† January 31, 1863, p. 138.

Rheumatic pains in the back or limbs, occasioned by cold, are stated to be removed by the use of a warm bath, into which about forty drops of the oil have been put.

Rheumatic toothache may be immediately relieved by rubbing the gum with the oil, and if there be a decayed hollow tooth, by putting a little of the wadding steeped in the oil, into the cavity. Rheumatic face ache, by moistening first the gums and then the cheek, with a few drops of the oil, and covering it with the wadding; and rheumatic earache, by putting a few drops of the oil mixed with almond- or olive oil upon a piece of the wadding, and introducing it into the ear. After a cure has been effected, it is recommended to continue the application of the remedy twice or thrice a-week, to prevent a return of the complaint.—*London Chemist and Druggist*.

Compressed Red Precipitate.—We have had forwarded to us from a subscriber at Taunton a specimen of red precipitate condensed into a solid form, so as to admit of being employed in the same manner as a pencil of lunar caustic.

The use of red precipitate as an escharotic has been frequently found inconvenient, owing to its having to be employed in the form of powder, which cannot be applied exactly where required. This source of annoyance is completely obviated by the formation of the remedy into a solid stick, which we should think would be found very useful in all cases where the employment of red precipitate is indicated.—*Chemist and Druggist*.

Water-Proof Walks.—But a new method of path-making is fast coming into vogue, and will soon be universally adopted for its cheapness, general excellence, and permanence; in fact, when once well done it lasts forever. Instead of making the walk of loose material, on the old fashion, concreting is resorted to, by which the appearance of gravel is retained with all its freshness and beauty of contrast to grass and flowers, and the walk itself is rendered as dry and durable as the best pavement. The *modus operandi* is as follows:—Procure a sufficient quantity of the best Portland cement, then with the help of a laborer turn up the path with a pick, and have all the old gravel screened, so as to separate the loam and surface weeds from it, and to every six parts of the gravel add three parts of gritty sand of any kind—but soft pit sand is unsuitable—and one part by measure of Portland cement. When these are well mixed together in a dry state, add sufficient water to make the whole into a moderately stiff working consistence, and lay it down quickly two inches thick on a hard bottom. A common spade is the best tool with which to spread it; it must be at once spread as it is to remain forever, and a slight convexity

given to the surface. In 48 hours it becomes as hard as a rock; not a drop of rain will go through it, and if a drop lodges on it, blame yourself for not having made the surface even; but a moderate fall is sufficient with such an impenetrable material. Not a weed will ever grow on a path so formed; not a worm will ever work through it; a birch broom will keep the surface clean and bright, and of course it never requires rolling. It is necessary to be very particular as to the quality of the cement, for a great deal of rubbish is sold under the name of real Portland. For the flooring of a green house, fowl-house, potting-shed or barn, this is the best and cheapest that can be had—always clean, hard, and dry, and never requiring repairing of any kind if carefully put down in the first instance. —*Journal Franklin Institute.*

Propylamin in Tic Doloureux.—Mrs. S., aged 56 years was attacked in December last, with the form of neuralgia commonly known as "*tic doloureux.*" She had, before this, been a hard laboring, but not a strong woman. The pain was very severe, amounting to paroxysms of the hardest kind, and did not yield to the common remedies. The usual chalybeates, vegetable tonics, anodynes and narcotics were administered, and subcutaneous injection was also resorted to. The stomach at last became irritable, and rejected both medicines and nourishment.

Narcotics and anodynes were then applied locally, and chloroform was administered largely, especially during the paroxysms. Blisters were next resorted to, and solutions of atropine and morphine were freely used on the blistered surface.

The pain gradually diminished, and the paroxysms became less frequent. Soon the patient began to recover her appetite, and the strength began to increase, so that on the first of the present month she was about the house, but not able to perform much labor.

About the 13th inst. she had another attack nearly like the first, but the pain was felt over a larger surface. It now extended along the side of the nose, back of the neck, through the shoulders and the length of the *left* arm. Much of the time, and especially during the paroxysms, she shrieked with pain. The remedies before used were resorted to, but without much effect.

Having heard of the *propylamin*, as prepared by J. R. Nichols & Co., being useful in cases of rheumatism and some nervous diseases, its use was suggested in this case, on the 15th inst., the patient at that time being no better. Twenty-five drops of *propylamin* were prepared with six ounces of water, and one tablespoonful was given to the patient once every two hours. After taking eight doses of the medicine, the pain had entirely left her. The blister had, during the same time, been occasionally dressed with the solution of morphia. The use of the *propylamin* was continued until March 18th, when she vomited a large quantity of a greenish-yellow fluid, and complained of great faintness and a sinking sen-

sation at the pit of the stomach accompanied by an intolerable *thirst*. The pain has not since returned, but a severe soreness remains wherever the pain has been; the use of the propylamin was discontinued.

March 20th.—The patient has no pain, but complains of a prickling, itching sensation in the shoulder joints, along the spine, in the knees, ankles and heels. The pain has not returned since before the vomiting began.

Not having had much experience in the use of propylamin, and never having known of its use in a case like this before, I should be glad to learn from those members of the profession who are better acquainted with its use, their experience, and also their opinion of its therapeutic action.

What would be the symptoms of an overdose?

Were the vomiting, faintness and intolerable thirst produced by it?

Were the prickling and itching sensations, two days after, produced by the same cause?

I have great confidence that the propylamin was the chief cause of relieving the pain in the present instance; but the question arises whether these peculiar symptoms were produced by the medicine or not, as I know of no other cause for them.

What would be the antidote for an overdose of propylamin?

Barne!, Vt., March 21st, 1863.

BENJ. F. EATON, M. D.

Boston Med. and Surg. Journ.

Copaiba and Storax as Specifics in Croup and Diphtheritis, by M. Tridau.—In the midst of a very fatal epidemic of diphtheritis, which had caused the death of two or three hundred persons in the Canton of Chailant, district of Loval, (Mayenne,) the idea occurred to me of employing a medicine acting powerfully on the mucous membrane, which would influence its vitality, and I made choice of copaiba and storax. From the first period of their employment, about five months and a half, I have cured five cases of croup and forty cases of diphtheritic angina. I have not lost but a single patient. In about twenty-four hours the amelioration commences, and a cure is effected in from four to six days.

I employ the copaiba either as a syrup, (one part to sixteen,) or in the solidified state. The storax is also employed as a syrup. For adults, I prescribe a table spoonful every two hours. For children, of 4 to 6 years, a teaspoonful taken in the same way. In serious cases an injection containing five grammes (seventy-seven grains) of copaiba is given twice a day.—*Rep. de Pharm. Mars, 1863.*

NOTICE.

AMERICAN PHARMACEUTICAL ASSOCIATION.

The Tenth Annual Meeting of the American Pharmaceutical Association will be held in the city of Baltimore, Maryland, on Tuesday, the 8th day of September, 1863, at three o'clock, P. M.

After taking counsel with prominent members of the Association in various parts of the country, and duly weighing an invitation to meet at Pittsburgh, it was determined to accept the prior official invitation of the Maryland College of Pharmacy. A meeting in Baltimore, it was thought, would be better attended at the present time than in any western location. In view of this decision, the members generally are earnestly invited to keep in memory the various interests of the Association, that should be developed at the Annual Meeting; the several standing committees are encouraged to early prepare their reports, and those members who accepted subjects for investigation at the Philadelphia meeting last year, are particularly invited to have their papers ready, and, in the event of not attending the meeting, to forward them to the President of the Association, care of Andrews & Thompson, Pharmacutists, Baltimore.

The objects of the Association are fully explained in Article 1st of the Constitution; the conditions of membership are in Article 2d. "Every pharmacist or druggist of good moral character and professional standing, whether in business on his own account, retired from business, or employed by another, who, after duly considering the objects of the Association, and the obligations of its Constitution, is willing to subscribe to them, is eligible to membership." Pharmacutists and druggists desirous of membership, may obtain further information, and a copy of the Constitution, by applying to the Chairman of the Executive Committee, Edward Parrish, 800 Arch St., Philadelphia. All applications for membership should, when possible, be in the hands of the Executive Committee at the opening of the first session.

WILLIAM PROCTER, JR., *President.*

Philadelphia, April 20th, 1863.

Abstract of the Minutes of the Philadelphia College of Pharmacy.

At the Forty-second Annual Meeting of the College held at their Hall, Third month 30th, 1863. The President in the Chair.

The Minutes of the Board of Trustees for the last six months were read, they inform that George Ashmead has been elected a Resident Member of the College, and that at the Annual Commencement, held on the 12th inst., the following Students of the School of Pharmacy, received the degree of Graduate in Pharmacy.

GRADUATING CLASS.

SUBJECT OF THESIS.

Adolphus Bachman.....	<i>The Apothecary's Position.</i>
Christian Berger.....	<i>Helleborus Niger.</i>
Franklin Coggins.....	<i>Cucurbita Pepo.</i>
George W. Eldridge.....	<i>Oryzococcus Macrocarpa.</i>
Daniel S. Fox.....	<i>Podophyllum Pellatum.</i>
George M. Hambright.....	<i>Cortex Radicis Myricæ Ceriferæ.</i>
C. Ferdinand Hoffman.....	<i>Morus Alba.</i>
James Kenworthy.....	<i>Krameria, Geranium, &c.</i>
Joseph C. Kirkbride.....	<i>Chimaphila Umbellata.</i>
Paul Frederick Lehlbach.....	<i>Alcoholic Fermentation.</i>
William McIntyre.....	<i>Leonorus Cardiacæ.</i>
Alfred Mellor.....	<i>Esculus Hippocastanum.</i>
Elijah S. Morell.....	<i>Pittosporum Tobira.</i>
Talbot C. Murray.....	<i>Commercial Lactucarium.</i>
Earl Penn Rohrer.....	<i>Chlorate of Potassa.</i>
James Ruan.....	<i>Cucurbita Peponis Semines.</i>
Edwin R. Smith.....	<i>Medicinal Compounds of Iron with Albumen.</i>
Jason P. Thomas.....	<i>Agathotes Chirayta.</i>
F. A. Tilge.....	<i>Symplocarpus Fœtidus.</i>
Edwin Tomlinson.....	<i>Eupatorium Perfoliatum.</i>
John B. Trednick.....	<i>Euonymus Atropurpureus.</i>
Henry J. Weber.....	<i>Subbatia Angularis.</i>

A Report was received from the Publication Committee, showing that the American Journal of Pharmacy has been regularly issued without reducing its size, though the diminished receipts of the Committee have not been adequate to meet the increasing expenses of publication consequent, in part, on the great advance in the price of paper. In view of the importance of maintaining the Journal unimpaired, on motion, the Com-

mittee was authorized to draw on the funds of the College to meet the deficit in its funds.

The Committee on Labels made a Report, showing a cash balance in their hands, a portion of which was, on motion, appropriated to the Committee on Sinking Fund.

The Committee appointed at the Semi-Annual Meeting to confer with the Commissioner of Internal Revenue, having no Report to make, the subject is continued in their charge.

The Annual Election was then ordered. Wm. C. Bakes and Wm. Evans, Jr., acting as tellers. After a recess they reported the following Officers and Committees as being duly elected :

<i>President,</i>	.	.	.	Charles Ellis.
<i>1st Vice-President,</i>	.	.	.	Samuel F. Troth.
<i>2d Vice-President,</i>	.	.	.	Dillwyn Parrish.
<i>Treasurer,</i>	.	.	.	Ambrose Smith.
<i>Recording Secretary,</i>	.	.	.	Edward Parrish.
<i>Corresponding Secretary,</i>	.	.	.	Wm. Procter, Jr.

Trustees.

Dr. Robert Bridges,	Daniel S. Jones,
Jno. M. Maisch,	T. Morris Perot,
T. S. Wiegand,	S. S. Bunting,
Saml. N. James,	Jas. T. Shinn.

Publishing Committee.

Charles Ellis,	E. Parrish,
Wm. Procter, Jr.,	A. B. Taylor,
J. M. Maisch.	

Committee on Sinking Fund.

S. F. Troth,	Ambrose Smith,	E. Parrish.
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Delegates to the American Pharmaceutical Association.

Edward Parrish,	Jas. T. Shinn,
Geo. J. Scattergood,	Wm. C. Bakes,
Wm. Evans, Jr.	

The meeting then adjourned.

EDWARD PARRISH, *Secretary.*

Editorial Department.

THE PHARMACOPEIA OF 1860.—We have pleasure in stating that the stereotyping of this work is progressing rapidly, about 320 pages having passed the committee. Those unacquainted with the extreme care which is required to avoid errors or blunders, can hardly appreciate the amount of trouble which it has cost the Committee, and especially the editor, Dr. Bache, so that not only shall no errors of sense be admitted, but that in language every part shall be consistent with the rest. Should no unforeseen delay occur, it is probable that the work will be ready before our next issue. The price will be at the much reduced rate of one dollar per copy, and it is greatly to be desired that every apothecary in the country, who has any regard for his profession, will obtain a copy, and use it as his guide-book for preparations. The process of percolation has been introduced most thoroughly, and the manipulation requisite to its conduction so carefully described as to leave no excuse for failure.

THE MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.—At page 279, our readers will observe the official announcement that the next meeting of the Association is to be held in Baltimore on the 8th of September next. Many would have preferred a more western locality, as Pittsburgh, Cincinnati, Buffalo, Cleveland, Detroit or Chicago; but it was strongly doubted whether the interest felt in the Association in those cities would have justified going there without a spontaneous invitation. Pittsburgh showed a warm hand, but the Maryland College of Pharmacy early expressed officially their wish to have the meeting in Baltimore. Besides the numerous apothecaries of that city, who form a respectable nucleus, its proximity to Philadelphia, Washington, New York, etc. give chances of support that favor the idea of a fair gathering. Add to these the number of members who generally attend the meetings, and we have grounds for the belief that the choice was the best, that, under the circumstances, could have been made. But whilst these probable causes of success operate, let the active members put their shoulders to the wheel, and urge on the movement by making a little sacrifice of time, to prepare their papers, and of money, to attend the meeting, and in this way keep the fire of professional zeal burning brightly, until our national troubles shall have subsided and left us free to pursue the objects of the Association untrammelled by the many adverse influences which arise from the present state of war.

THE UNITED STATES ARMY LABORATORY.—The actual history of the medical supplies to the U. S. Army during the present rebellion, will furnish an interesting chapter in the history of the war should it ever be faithfully written. From the time when the first general battle in Virginia enlisted the sympathies of all in providing hospital supplies, to the period when the present almost luxurious outfits of the surgical department commenced, various changes and improvements have been made, and if we may credit the half that is told, the most glaring want of economy in the management of the supplies has occurred. The fitting out of hospital supply wagons with drawers and bottles as complete as in a family medicine chest, was a great advance, and doubtless has aided materially in giving that prompt relief to the wounded and sick which greatly reduces the fatality of military surgery and hospital treatment. Perhaps no one has had more to do in giving a practical character to these improvements than Dr. Edward R. Squibb, late of the U. S. Naval Laboratory. Since the accession of Dr. Hammond to the Surgeon Generalship, however, the idea of establishing laboratories entirely under the control of the Medical Bureau of the army has been suggested, and three such have been commenced, one at New York, one at St. Louis and the other in Philadelphia; each being under the direction of a Surgeon of the army, who of course has to employ a competent pharmaceutical chemist to conduct the laboratory. Dr. A. K. Smith, has control of the Philadelphia establishment, and has appointed our friend Prof. Maisch, late of Dr. Squibb's laboratory, to superintend the laboratory, which is being located at 6th and Oxford streets, where he expects to conduct the various chemical and pharmaceutical processes, including pulverization of drugs, and putting up in suitable packages these and other supplies for the army. Should the war continue, this arrangement may be conducive to economy, if its management falls into able and conscientious hands; yet it may well be doubted whether the result will prove its wisdom as to economy in expenditure. If the same liberal course is pursued that formerly appertained to the Naval Laboratory, these establishments may have a useful influence in controlling the quality of drugs by exposing imposition, whether the result of ignorance or rascality.

MEDICAL DEPARTMENT OF THE UNIVERSITY OF PENNSYLVANIA: VACANT PROFESSORSHIPS.—The termination of the late session of this venerable Institution was marked by the resignation of two of its oldest and most esteemed Professors, who retire from their labors after a long service in the cause of medical instruction—Prof. Samuel Jackson and Prof. Hugh L. Hodge. Prof. Jackson commenced his professorial career in the Philadelphia College of Pharmacy at its primary course 1821–22, with the branch of *materia medica*. He resigned from the College, however, some years before his accession to the Chair of Physiology in the University which he has filled with success for nearly thirty years. The vacancies thus occasioned are to be supplied during the present month.

NEW YORK COLLEGE OF PHARMACY.—At an adjourned meeting of that College, held on Thursday 26th last, the following officers were elected to serve during the ensuing year :

H. T. Kiersted, *President*. John Milhau, *1st Vice-President*. John Meakim, *2d Vice-President*. Isaac Coddington, *3d Vice-President*. Thomas T. Green, *Treasurer*. P. W. Bedford, *Secretary*. J. Carle, Jr., W. Neergaard, J. W. Shedden, G. W. Southwick, J. H. Westerfield, G. C. Close, G. D. Coggeshall, A. W. Gabaudan, W. Wright, Jr., *Trustees*. J. Meakim, G. C. Close, W. Neergaard, F. F. Mayer, P. W. Bedford, *Delegates to the American Pharmaceutical Association*.

COMMENCEMENT OF THE NEW YORK COLLEGE OF PHARMACY.—As announced in our last issue the thirty-third Annual Commencement of this institution took place on the nineteenth of March, at the chapel of the New York University, before a large and fashionable audience.

The exercises consisted in an opening prayer by Rev. Isaac Ferris, D. D. LL. D., Chancellor of the University, and an address by the venerable President, Henry T. Kiersted, Esq., at the close of which he conferred the degree of Graduate in Pharmacy on

Gustavus Krehbiel, of New York City.

Ernest V. Triolet y Le Lievre, of Santa Isabel, Cuba.

Charles B. Smith, of Newark, N. J.

Theobald Frohwein, of New York City.

James S. Higgins, of New York City.

The Valedictory Address to the Graduates was delivered by Prof. John M. Maisch.

The proceedings were enlivened with some excellent music discoursed by Dodworth's orchestra.—*Druggists' Circular*.

MASSACHUSETTS COLLEGE OF PHARMACY.—At the annual meeting of the Massachusetts College of Pharmacy the following members were chosen officers for the ensuing year :

Thomas Hollis, *President*. Chas. A. Tufts, Samuel M. Colcord, *Vice-Presidents*. Henry W. Lincoln, *Record Secretary*. James S. Melvin, *Corresp. Secretary*. Ashiel Boyden, *Treasurer*. Joseph T. Brewer, *Auditor*. Daniel Henschman, Isaac T. Campbell, A. P. Melzar, Elijah Smalley, John Buck, Albert G. Wilbor, Robert R. Kent, Geo. D. Ricker, *Trustees*.

ST. LOUIS PHARMACEUTICAL ASSOCIATION.—At a Monthly Meeting in March, of the St. Louis Pharmaceutical Association, the following Officers were elected for 1863.

President, Theodore Kalb. *1st Vice-President*, James W. Francis. *2d Vice-President*, Edwin R. Swann. *Recording Secretary*, James McBride. *Corresponding Secretary*, Eugene L. Massot. *Treasurer*, Thomas Scott. *Executive Committee*, Enno Sander, Thomas Tanton, Joseph McCullough,

James McBride, Arthur P. Hollister. *Committee on the Progress of Pharmacy*, Alexander Leitch, Thomas Scott, Edwin R. Swann, Hubert Primm, Eugene L. Massot.

There were very few in attendance at the meeting, and it appears that all interest in the Association, or in the advancement of Pharmacy in St. Louis, has gone.

Yours truly,

E. L. Massot, *Corresponding Secretary*.

COMMENCEMENT OF THE PHILADELPHIA COLLEGE OF PHARMACY.—The Annual Commencement of the Philadelphia College of Pharmacy was held at the Musical Fund Hall, on the evening of Thursday the 12th of March, on which occasion the President conferred the degree of Graduate in Pharmacy on twenty-two students of the School of Pharmacy. The Valedictory Address, delivered by Prof. Robert P. Thomas, was listened to with marked attention by a large audience.

Just before the ceremony commenced, and whilst the Professors, the Trustees and their invited friends were in the room below the Hall, Geo. M. Hambright, on behalf of the Graduating Class of 1863, presented to the College a portrait of Prof. George B. Wood, late of the University, and one of the oldest living ex-professors of our School of Pharmacy. Prof. Bridges, as Chairman of the Board of Trustees, accepted the gift. The speaking on the occasion, though brief, was very appropriate, and the picture highly creditable to the artist as a excellent likeness.

Chemistry. By William Thomas Brande, D. C. L., F.R.S.L. and E., etc. and Alfred Swaine Taylor, M. D., F.R.S., etc. Prof. of Chemistry and Medical Jurisprudence in Guy's Hospital. Blanchard and Lea, Philada., 1863. pp. 690. Octavo.

This work is a reprint of the English edition, without comment, but its passage through the press was superintended by a competent chemist. The authors appear to have aimed at producing a book specially adapted to the student who is desirous, with as little impediment from technicalities as comports with a clear development of the science, of getting an insight into its principles and laws, as well as of the appearance and properties of chemical substances.

In the struggle after a key to the natural arrangement of chemical bodies, so many theories have been advanced, so many systems of classification and nomenclature been suggested, and so much that, as yet, is merely hypothetical, has been introduced to fill up the gaps, that the student is in danger of mistaking the scaffolding for the building. In truth, the recorded observations are so numerous, and so many evidently important facts and discoveries stand isolated from the general arrangement, that until some master hand arises capable of systematizing these more effectually than has yet been done, the student will find works like Fownes and Turner to be more profitable than those of Gmelin or Liebig. The authors re-

mark, "With ample material at our disposal to produce two volumes in place of one, we have studiously endeavored to compress within these pages a selection of the more important facts and doctrines of modern chemistry. We have adopted for the explanation of these facts, that simple chemical language which has found acceptance in the schools and colleges of Great Britain, France and Germany, as well as in the best treatises on the science."

"In addition to the general properties of bodies, we have attached to the description of each substance, a summary of its most important characters, with an account of the special tests required for its detection. The student will thus have in this book a *manual of practical Chemistry*. As an adjunct to this branch of the science the subject of *practical Toxicology* has been introduced in reference to the most important *poisons*, and the process for their detection."

How far the authors have succeeded in attaining their object we cannot decide without more time for examination, but so far as we have looked through the inorganic portion of the work, we have been favorably impressed with its simplicity and clearness. Taking oxygen, for example, we have a succinct historical notice, a full account of its preparation by several processes, its properties, the nature of oxidation, the constitution of the oxacids, reduction, decay, eremacausis, putrefaction, the chemical tests, combustion, ignition, the nature of flame, and finally, ozone and antozone, and their compounds, embraced in twenty-six pages. This fulness is noticed in regard to water, charcoal, ammonia, etc., the remarks having a view to the practical importance of the subjects. Under the head of silver, the subject of photography is very clearly developed in regard to Daguerreotyping and the collodion process on glass and on paper.

In the organic department no scientific arrangement has been attempted. Substances are grouped in the simplest manner: as the starchy group, lignin and products, essential and fixed oils, organic acids and alkalies, coloring principles, etc. The authors evidently have not devoted as much labor to this department as to the inorganic; yet by a judicious selection of language, they have managed to make the individual subjects clear, and in many cases full. One striking peculiarity of the book is the absence of wood cuts. The authors, in a prefatory note, speak rather disparagingly of this mode of illustration, and refer their readers to catalogues of chemical apparatus, but we beg leave to differ from them in regard to the value of these figures as aids to the student, believing that many processes are much more easily understood by the help of diagrams. In conclusion, we believe this volume has strong claims to the consideration of chemical teachers in our medical and pharmaceutical schools, for whose use the authors are well qualified to adapt it by their long experience as teachers.

The Druggists' Receipt Book: comprising a copious veterinary formulary; numerous recipes in patent and proprietary medicines, druggists' nostrums,

etc. ; perfumery and cosmetics, beverages, dietetic articles and condiments, trade chemicals, scientific processes, and an appendix of useful tables. By Henry Beasley. Fourth American, from the fifth London edition. Philada: Lindsay and Blakiston, 1863.

The Druggist's Receipt Book embraces many recipes useful to the apothecary, and should have a place on his book shelf for shop use.

The Sunbeam and the Spectroscope. By Howard Townsend, M. D., Prof. of Materia Medica, Albany Medical College. Read before the Albany Institute, Feb. 17th, 1863. pp. 15.

We have rarely met with an essay more to the point, less clogged with unnecessary words, or giving a clearer view of the subject of which it treats,—the nature of light and the wonderful developments of the Spectroscope. We cannot do better than give an example :

“ Lavoisier has very beautifully said—

‘ The fable of Prometheus is but the overshadowing of a philosophic truth : Where there is light *there* is organization and life ; but where light cannot penetrate *there* death forever holds his silent court.’

If a sunbeam be allowed to enter a darkened room, it falls on the floor and forms a disc of bright light. This is radiated to the eye which conveys the impression to the brain, and the phenomenon of vision is established.

Should the hand be placed in the track of the sunbeam, the sensation of warmth is communicated, and we feel there is heat in the rays.

If a piece of paper covered over with chloride of silver, which is purely white, be placed so that the sunbeam falls upon it, a darkened track will be immediately produced over the space the sun's ray has passed ; it has liberated the chlorine, leaving the metallic silver.

Such remarkable phenomena teach us that we have to deal with agencies in the solar rays, which are in their visible effects very dissimilar.

Actinism, which means *ray power*, is now the term adopted to express the chemical principle of the sunbeam.

That these three functions of the sunbeam—light, heat and actinism—all differ from one another, may be thus proven.

A piece of black mica will allow no *light* to pass through it, but offers no obstruction to *solar heat*.

A plate of glass, stained apple green with oxyde of copper, is perfectly transparent to light, but opaque or impermeable to heat.

Glass which has been stained yellow with oxide or chloride of silver allows a flood of light to pass through it, but permits no permeation of an *Actinic ray*.

And on the contrary, if we use a glass colored deeply blue, with the oxide of cobalt, though but very little light can pass through it, experiment proves that it offers no obstruction to the chemical rays ; that is, it permits the permeation of the Actinic ray.

This fact of yellow glass interfering with and intercepting the actinism of the sunbeam, has lately been taken advantage of in photography. The photographer no longer shuts himself and his prepared plate in a dark dungeon, for now the old dark chamber, camera obscura, is beautifully illumined by the sun's rays passing through yellow glass, which effectually excludes the actinic, the chemical rays which alone the photographer dreads in this part of his process, but which allows all illuminating rays to be transmitted.

The strength of evidence appears to be in favor of considering light,

heat and actinism as three distinct principles or powers, active in regulating the great phenomena of nature. These agents are unceasingly at work. It is impossible to expose any body, however solid and persistent it may appear, to the influence of sunshine, without its undergoing a molecular or chemical change. In darkness, all bodies appear to possess the power of restoring themselves to their normal state. Should the sun shine uninterruptedly upon a granite monolith or a bronze statue, it would perish independently of any other destructive influences.

Night seems as necessary to secure the permanence of the inorganic world as darkness and sleep are essential to maintain in healthful life the organized creations."

Canada Lancet. Edited by Wm. E. Bowman, M. D., Montreal, C. E.

This is the title of a monthly periodical which commenced its existence, March 14th, 1863. Each number contains eight pages.

OBITUARY.

WARDER MORRIS, one of the original members of the Philadelphia College of Pharmacy, died on the 10th of March, 1863, in the seventy-fourth year of his age. Mr. Morris' parents were Philadelphians, but removed to Pottsgrove, Pa., where he was born Oct. 3d, 1789. At an early age he entered the service of a druggist named Elliot, in Front street, and, when twenty years old, he commenced business on his own account at 45 north 3d street, where he continued the business personally for forty-four years, he retiring in 1853. Warder Morris took an active part in the establishment of the College, and, until a few years back, continued his interest in its proceedings. His mind possessed strongly marked peculiarities. In deliberations with his fellow-members, he gave his opinion freely, without fear or favor, and was sometimes a little caustic; nevertheless his really kind nature dispelled any bitterness, and always retained for him the respect of his associates.

PROF. LEHMAN, of the University of Jena, the renowned Physiological chemist, died on the 6th of January, whilst yet in the prime of life. He had been connected with the University eight or nine years, and was much esteemed as a lecturer and practical instructor. Prof. Lehman is well-known in this country as the author of the *Physiological Chemistry*, published by the Cavendish Society.

ERRATA.

Vol. xi. Page 20, 4th line from below: place *as a qualitative reagent* after "Planta-Reichenau."

Page 21, 13th line from above, read: "1-30.000 of an equivalent of Conia."

Page 23, 1st line from top, read: 60 instead of "100."

Page 23, 12th line from below, read: 10 instead of "40."

Also, vol. x., p. 388, 3d line from top, put *solution* for "sulphate," and *boiled* for "boiling."

THE
AMERICAN JOURNAL OF PHARMACY.

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JULY, 1863.  
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CHEMICAL NOTES ON SOME SCROPHULARIACEÆ.

BY FERDINAND F. MAYER.

This interesting family has lately again been drawn into notice by the identification of *melampyrite*, the saccharine principle of *Melampyrum*, *Scrophularia* and *Rhinanthus*, with Laurent's dulcite, by L. Gilmer,* and the establishment of the systematic formula for this sugar by Erlenmeyer and Wanklyn,† who have proved it to be an alcohol of hexylen.

Besides, what is more important from a medical point of view, the discovery of the principle to which *Digitalis purpurea* mainly owes its value, of a volatile alkaloid, has been announced by Engelhardt,‡ whose detailed accounts are yet to be forthcoming.

As I have myself before noticed this alkaloid during my investigations of narcotic preparations, however, without having been able, from want of time and material, to isolate it as has been accomplished by Engelhardt, and without wishing to anticipate the results of that chemist, I may be permitted to give here some notes of my own experience on the properties of some proximate principles of this plant, and of *Veronica* and *Gratiola officinalis*, in connection with a preliminary investigation of one of our indigenous medicinal plants, the *Veronica Virginica* of Linné, or *Leptandra Virginica* of Nuttall.

After a general examination of the Eclectic resinoid *Leptan-*

* Ann. Chem. Pharm. cxxiii. 372.

† Journ. Chem. Society, Nov. and Dec., 1862.

‡ Neues Jahrb. für d. Pharm. Januar, 1863, from Zeitschrift für Chemie und Pharm., 1862, p. 722.

drin had satisfied me that the plant from which it is derived, besides a volatile alkaloid contained a copulated body, agreeing in its properties partly with Rochleder's saponin and caincin,* so far as made known, and with Quevenne's *acide polygalique modifiée* † and Homolle's digitaline as regards precipitability by gallo-tannic acid: I met with a suggestion to the same intent on receiving Prof. Rochleder's last paper on the seeds of *Æsculus Hippocastanum* ‡ which had been in course of preparation since 1852.

This paper closes with the following remarks: "There is but little room for doubt but what æscigenin, or compounds of the same, may likewise occur in other plants. From among the class of bodies bearing resemblance to it, I would here only refer to cyclamin, the composition of which closely agrees with that of æscinic acid. . . . The digitaliretin of Walz, for which he has given the formula $C_{32}H_{26}O_6$, requiring 72.2 p. c. C, and 9.8 p. c. H, according to his description also closely resembles our æscigenin. The formula of the latter, before being dried at 130° C, is $C_{48}H_{39}O_9$ (digitaliretin multiplied by $\frac{3}{2}$). The digitaliretin described by Kosmann, for which he has calculated the formula $C_{30}H_{25}O_{10}$, has 63.15 p. c. C and 8.77 H, which very nearly agrees with the composition of argyræscetin. The other product analyzed by Kosmann (*la digitaline*,) for which he has given the formula $C_{54}H_{45}O_{30}$, approaches near enough in its composition (53.2 p. c. C. and 7.4 p. c. H) to some of the sub-

* Ber. Wien. Akad. Band xlv. Neues Repert. f. Pharm. Band xi. 376.

† Journ. de Pharm. Juin, 1837. Handwörterbuch der Chemie, vi. 621.

‡ Ber. Wien. Akad. Band xlv. April, 1862. Chem. Centralblatt, 1863. January 14th and 21st. These seeds contain a saponaceous but crystallizable bitter principle, *argyræscin* (Fremy's bitter principle,) an amorphous substance, *aphrodæscin* (Fremy's saponin and æsculinic acid.) Acids split the former into *argyræscetin* and sugar, and afterwards, as do alkalis, into the same products as those produced from *aphrodæscin*, viz: *æscinic acid*, *telæscin* and *æscigenin*, the two last named supposed to be identical with kinovin and (Hlasiwetz and Gilm's) kinovic acid. A secondary product of the action of alkalis on *argyræscin*, besides a saccharide, is propionic acid, on *aphrodæscin*, butyric acid. There is also generally present in small quantities another glucoside, which, by the treatment with alkalis, yields valerianic acid. The yellow coloring matter gives quercetin.

stances lately described by the author. . . . Nor is it necessary to refer any further at this time to several substances described by Walz, the composition of which, as well as the properties, indicate a connection with the substances described by me.”
—(Rochleder.)

On comparing the analyses of Walz's bitter principles of the Scrophulariaceæ, this similarity is very striking. As to Kosmann's digitaline, its centesimal composition is the same as that adopted by Rochleder for saponin, yet there are certainly very decided differences in their physical and chemical properties; on the other hand, it fully agrees with the first analysis of gratiofolin published by Walz.*

But it would also appear as understood from the above quotation, that the precipitation by tannin, first noticed by Gehlen as a property of the impure saponaceous principle of senega, and by Quevenne in his modified polygalic acid,—and which Homolle, Eug. Marchand, and Walz have employed in obtaining the non-volatile bitter principles of the Scrophulariaceæ,—likewise belongs to the secondary products described by Prof. Rochleder, though no mention is made of it in the papers at my disposition.

Under the same head we most likely will have to class the sal-separin of Thubeuf, and the smilacin of Folchi (Palotta's pariglin, Batka's parillic acid,) the similarity of which to kinovin was pointed out by Prof. Buchner, Jr., and also the smilachin (from *Smilax China*, L.) of Reinsch.

Here also belongs the acrimonious principle of *ginseng*, the root of *Panax quinquefolium* to which the panaquilon of Garrigues appears to stand in a similar simple relation, as that of sapogenin to saponin.

There are very many medicinal plants which owe the principal part of their therapeutical effect to the presence of substances not azotised, which are precipitable by gallo-tannic acid, while others contain similar principles which by the action of acids or alkalies can be so far changed as to show the same behaviour. But whether this reaction may eventually be used

* Jahresbericht für die Chemie, 1851. Buchner's Repert, Bd. cix. p. 12.

to determine the relative value of such plants, can as yet not be decided.

The few experiments about to be detailed were undertaken principally to gain certainty upon two points,—the presence of a saponaceous principle, and the origin of the substances precipitable by tannin.

It will not be uninteresting to premise, as far as pertinent, the chemical history of this family. As a matter of course, the experiments appended have as yet no pretension to scientific value.**

Digitalis purpurea.—The presence of an alkaloid in this plant has before been announced by Lancelot,* Radig,† and Watson J. Welding.‡

But these statements, on examination, appear very doubtful. Otherwise the analysis by Radig, of which I can only quote the tabulated results, appears entitled to more credit, since he has eliminated two substances really existing in the plant, though altogether ignored by subsequent writers. These substances are a bitter principle, *picrin*, which is removed from the infusion by means of ether, and *scaptin*,|| a substance soluble in water, possessing the acrid taste of saponin. In case that future experiments should establish the identity of constituents in the plants of this family, it would much lighten its literature, if the name *scaptin* were retained for the saponaceous principle.

Dulong, as quoted by Donovan and Homolle, likewise obtained a bitter extractive, soluble in water and alcohol, but little only in ether.

From Homolle's prize essay § dates the repute of the car-

* Ann. Chem. Pharm. xii, 251, 1833. Handwört, 1st ed. ii. p. 603.

† Pharm. Centralblatt, 1835, No. 14. Pereira, Elements, ii. p. 457.

‡ Thesis before the Philadelphia College of Pharmacy. Am. Journ. Pharm. v. 89.

** [For the previous history compare a paper by Dr. Donovan from *Dublin Journal of Med. Sciences*, May, 1839, in *Am. Journ.* xi. p. 204, and by MM. Brault and Poggiale from *Journal de Pharmacie* in *Am. Journ. Pharm.* vii. p. 218.]

|| From *σκάπτειν*, to scrape.

§ *Journal de Pharm.*, Janvier, 1845. An abstract from the *Chemical Gazette*, in *Am. Journ. Pharm.*, xvii. 97 and 104.

bohydrates precipitated by tannin, which are now employed in medicine as digitaline. As originally prepared, this amorphous substance was very difficultly soluble in water, still more so in ether, somewhat more soluble in ether-alcohol, but readily in alcohol. As distinctive test, Homolle mentions the action of strong hydrochloric acid on this substance, which dissolves rapidly into a yellowish liquid, and this, after a few seconds, turns of an emerald color, gradually growing darker. Its aqueous solution was not precipitated by subacetate of lead, but by tannin.

Soon after followed some papers by Morin,* Kosmann,† and especially those of Walz,‡ who separated the body precipitated by tannin from a neutral solution into three substances: *digitalin*, little soluble in water; the alcoholic solution congeals on evaporation; but neither this substance nor the two others are colored by hydrochloric acid; *digitasolin*, more soluble in water, little in ether; and *digitalicrin*, insoluble in water, soluble in ether.

In 1851, appeared the essay of Homolle and Quevenne|| in which they describe a number of substances of the same kind, but under different names, viz.: *la digitaline* (Walz's digitalin,) *le digitalin* (digitasolin,) *digitalose* (digitalicrin,) and *digitalide*. They insist besides on the green coloration with hydrochloric acid.

Immediately after, A. Buchner, Sr., published a paper on the seeds of *Digitalis*§ from which he obtained a drying oil, and Homolle's original digitaline; at least this substance gave to him a green color with hydrochloric acid on the application of heat. He mentions that pure digitalin is precipitated neither

* Am. Journ. Pharm. xvii. 181, from Journ. de Pharmacie, Avril, 1845.

† Journ. des. Connaiss. Méd. Nov. 1845. Buchner's Reperit, xcii. 348. Handwört, 2d ed. ii. 3 p. 462.

‡ Jahresbericht d. Chem. for 1847, p. 646, and for 1851, p. 567. Wittstein's Vierteljahr, x. 234.

|| Mémoires sur la Digitaline, par MM. Homolle et Quevenne. Rapports faits à l'Académie Nationale de Méd., le 8 Janvier 1850, et le 4 Février, 1851, par MM. Rayer, Soubeiran et Bouillard.

§ Reperit f. die Pharm. cix. p. 38. Extract from Chem. Gazette, in Am. Journ. Pharm. xxiv. p. 153.

by tannin nor by sulphuric acid, as formerly stated by L. A. Buchner, Jr., and others ; that the precipitate with tannin is soluble in hot water, from which it again separates on cooling, and that the alcoholic extract dissolved in water, after precipitation with subacetate of lead and removal of the excess of lead by sulphuric acid, has, before the addition of tannin, the property of frothing strongly when shaken.

The first analysis of digitalin by Walz and that by Delffs,* agrees pretty closely with the formula of Rochleder's telæscin, that of digitasolin with one of the products intermediary between æscinic acid and telæscin, and that of digitalicrin with the formulæ of some products intermediate between telæscin and æscigenin.

Ludwig† and Delffs noticed the production from digitalin by the action of dilute mineral acids in the heat, of some substance capable of reducing suboxyd of copper from Fehling's solution.

In 1858, Walz revised‡ the results of his former researches, and remodelled among other the nomenclature of the substances precipitated by tannin. He designates as *digitalin* the former digitasolin, as *digitaletin*, the former digitalin, and as *digitalacrin* that portion of ordinary medicinal digitaline which is soluble in ether. Both the new digitalin and digitaletin by boiling with dilute acids are split into a sugar and *digitaliretin*, soluble in ether, and *para-digitaletin*, insoluble in ether. Digitalacrin is likewise a complex mixture. Walz found in it, besides fatty matter, two acrid resins, one soluble, the other insoluble in ammonia; they both dissolve in warm hydrochloric acid with an olive-green color.

Kosmaun in 1860,|| without reference to the previous researches of Walz, gave the division of (1a) digitaline by dilute sulphuric acid into fermentable sugar and *digitalirétine*, a substance differing from that to which the same name had previously been given by Walz. By the action of caustic soda,

* Jahresber. d. Ch. for 1858. Archiv der Pharm. Bd. cxlv. p. 330.

† Jahresber. d. Ch. for 1855.

‡ Jahresber. d. Ch. f. 1858. Vierteljahresschrift f. Pharm. x. 234.

|| Journ. de Pharmacie, [3] Tome xxxviii. p. 5. Pharm. Journ. Fransact. [2] vol. ii. No. 3. Am. Journ. Pharm. vol. xxxiii. p. 69.

digitaline is converted into *acide digitalinique*, which is separated in a solid form by neutralizing the alkaline mixture. The acid filtrate from this precipitate gives, with nitrate of silver, a white flocculent precipitate, which turns black in the light; with a solution of copper a sky blue precipitate, and (a white) one with neutral acetate of lead. This *acide digitalinique* has many points of resemblance in common with Morin's *acide digitalique*.

Since then Dr. Homolle has reopened the question, to which constituent of the leaves belonged their peculiar therapeutical effect. From his latest experiments * he concludes that the most active ingredient is a fatty substance extractible by ether. He compares it with the *acide digitoleique*, which Kosmann, in 1846, obtained from the precipitate with subacetate of lead by extraction with ether, very likely the same as the *digitaloin* or the *digitaloic acid* of Walz.†

The peculiar odor of this and other plants of the same family, is due in part to the presence of a free volatile acid, Morin's *antirrhinic acid*,‡ partly to a stearopten (Welding), Walz's *digitalosmin*.||

Walz has examined the acid distillates from *Digitalis purpurea*, and *D. latea*, from *Gratiola officinalis*, *Antirrhinum majus*, *A. cymbalaria*, *Linaria vulgaris*, *Scrophularia nodosa*, *S. aquatica*. They appear to have been in nearly all cases mixtures of formic, acetic, propionic, butyric and valerianic acids.

From the two species of *Scrophularia*, Walz obtained substances analogous to those derived from *Digitalis* and *Gratiola*, viz.: *Scrophularin*, α and β ; *scrophularosmin*, etc,§ and from the others mentioned above,¶ the bitter principles *antirrin*, *antirresin*, *antirracrin*, *cymbalarin*, *linariin*, an odorous stearopten *antirrosmine*, and a peculiar volatile acid, *antyrhnic acid*, from *Linaria vulgaris*, DeC. From the yellow flowers of the last

* Archives Génér. 5 Série, xviii. Juillet, 1861. Cannstatt's Jahresb. f. 1861, p. 260.

† Gmelin's Handbook, Cavend. ed. vol. xiv. p. 530.

‡ Journ. de Pharm., Avril, 1845. Handwörterb. 2d. ed. ii. 1, p. 145

§ Gmelin's Handbook, vol. xiv. p. 533.

‡ N. Jahrbuch f. d. Pharm. Band xxvi. p. 296; xxvii. p. 12.

¶ N. Jahrbuch f. d. Pharm. 1853.

named plant, which are occasionally used as a yellow dye, Riegel* has obtained a crystalline yellow coloring principle, *anthokirrin*, which appears to stand in a close relation to one of the yellow principles yielding quercetin.

My experiments were made with portions of the dried plants, and, the object in view having been explained, will be given so far as successful.

The three substances discovered by Radig in *Digitalis* can be separated in the following manner to better advantage:

An alcoholic fluid extract of the leaves, left to spontaneous evaporation until reduced to the consistence of mellago, then placed for three days on a dialyser floating on water, yields with it a clear brownish-yellow solution of acid reaction, from which the three substances can be precipitated by tannin.

They are, however, obtained separately by adding to the liquid a solution of iodohydrargyrate of potassium, neutralizing the free acid cautiously with caustic alkali, and again slightly acidulating the liquid with oxalic acid. The precipitate which now appears, contains all the alkaloid. It is necessary to remove the free volatile acid by combining it with fixed alkali, on account of the solubility of the iodohydrargyrates of the alkaloids in volatile organic acids.

The slightly acid liquid, after the removal of the alkaloid gives with tannin a curdy, afterwards resinous, precipitate. Dissolved in dilute alcohol and decomposed by acetate of lead, the solution, after being freed from excess of lead by sulphuretted hydrogen, and reduced by evaporation, yields a pale yellowish-green resin, which gives a green solution with hydrochloric acid; this is again rendered turbid by water.

A third precipitate is caused by neutralizing the filtrate from the second precipitate and adding more tannic acid. It possesses the properties mentioned by Homolle and Buchner, and yields a glucoside, or mixture of glucosides (digitaline.)

The ordinary digitaline and that obtained in this manner, are to some extent soluble in water. Their solution froths strongly when shaken, and gives a faint precipitation with subacetate of lead. The substance to which this frothing is due, is carried

* Pharm. Centralblatt, 1843, p. 454.

down from all watery solutions with precipitates; still it is present only in small quantity, at least in the dried leaves.

The alcoholic extract, dialysed or diluted with water, was precipitated with neutral acetate of lead, the filtrate again precipitated with subacetate of lead, and the last precipitate suspended in dilute alcohol and decomposed by sulphuretted hydrogen. The resulting liquid after boiling, evaporating and filtering, gave, upon being shaken up with crystals of caustic baryta, a yellowish-white precipitate, precisely like similar solutions of saponin; the filtrate from this compound of baryta, after removing the excess of baryta by carbonic acid gas, gave the usual precipitate with tannin. But the baryta compound on the filter undergoes a change while it is being treated with baryta-water for the purpose of purification, and it is finally no longer soluble either in water or alcohol.

The precipitate produced with acetate of lead contains a yellow coloring matter, from which, however, no quercetin could be obtained.

A sufficient quantity of the alkaloid for examination was procured from the alcoholic fluid extract as follows: The fluid extract reduced to the consistence of soft extract by spontaneous evaporation, was treated with ordinary water of ammonia, in which it dissolves almost completely. This solution was supersaturated with sulphuric acid, care being taken to avoid a rise of temperature; the brown colored, acid liquid filtered from precipitated resin, was then again neutralized, placed in a flask with sufficient chloroform and a very small quantity of caustic soda lye, and then well agitated; the same quantity of chloroform being used subsequently for the extraction of several portions of the extract. In this manner a more concentrated solution is obtained than by direct treatment of the extract, and much of the loss caused by distillation of the plant with a fixed alkali is avoided.

The chloroformic solution, besides alkaloid, contains a brownish-green, fatty resin, of a nauseous odor, which gives an emerald-colored solution with acids.

Falken's test for determining the efficacy of the leaves* appears

* Am. Journ. Pharm. xviii p. 160.

to be independent from the presence of the alkaloid. The latter at least gives no precipitate with yellow prussiate, while the watery solution of the extract of Digitalis, as well as of Leptandra is precipitated even after the removal of the alkaloid.

Leptandra Virginica, Nuttall, (*Veronica Virginica*, L., *Eustachya*, Rafinesque) has been before examined by Mr. Wayne.* He evaporated the alcoholic tincture; and obtained the so-called resinoid leptandrin by the addition of water. The filtrate precipitated by subacetate of lead, and freed from excess of the metal, left a bitter substance soluble in water and in ether, which is taken up by charcoal. The alcoholic decoction from the latter, leaves on evaporation a green substance possessing the nauseous taste of the root, and it yields to ether a crystallizable substance and a green resinous body, both of a bitter taste.

Somewhat later,† Mr. Wayne examined a saccharine principle obtained from the liquor after the precipitation of the resinoid, which proved to be mannite.

The root, as well as the extract and other of its preparations, possess a peculiar almond odor. I noticed that this is more strongly developed when an alcoholic tincture, mixed with some acid, is boiled in an open capsule. Distilled with dilute sulphuric acid, the root yields an acid distillate of a very unpleasant odor, and which contains traces of formic acid.

The various preparations treated with acids for some time in the heat, turn into dark, green-colored resins. The acid solution from the resinoid contains an appreciable amount of a volatile alkaloid, agreeing so far as it appears in its properties with that of digitalis. It is obtained from the alcoholic fluid extract by treatment with ammonia as before described.

A decoction with 90 p. c. alcohol, deposits on standing, only a very minute quantity of indifferent matter. Ether separates from it after some time a few granular crystals, soluble in water, (mannite?)

This tincture, evaporated to expel the alcohol, then diluted with water, was precipitated first with acetate, then with subacetate of lead, and the filtrate from the last precipitate freed

*Proceed. Amer. Pharm. Association, 1856, p. 34.

† Am. Journ. Pharm., vol. xxxi, p. 557.

from lead. After its purification and neutralization it yields a greyish white precipitate with tannin, from which a mixture of glucosides is obtained, precisely as in the case of digitalis, but not nearly as bitter, soluble in alcohol, but only partially soluble in water and in ether.

The precipitate with acetate of lead, treated with dilute acetic acid, yields in solution a very small quantity of citrate of lead.

The precipitate with subacetate of lead, was of a pale yellow color. It was treated as nearly as possible by the methods described in the last publications of Prof. Rochleder, but yielded only *one* saponaceous principle. This was obtained in small quantity, but tolerably pure, by decomposing the precipitate in the manner described above, suspended in dilute alcohol by a current of sulphuretted hydrogen. The pale yellow solution which resulted, was freed from sulphuretted hydrogen and alcohol by boiling, and after filtering treated with crystals of baryta; the greenish yellow precipitate was collected on a filter and washed with cold saturated baryta water. The filter was then transferred to a flask with water, which was kept boiling, while a current of carbonic acid was conducted through it. The solution, filtered from the carbonate of baryta, yields on evaporation the saponaceous principle as an amorphous, more or less colored mass, closely resembling senegin in its properties, but more readily decomposed by alkalies.

The filtrate from the precipitate with baryta gives apparently the same precipitate with tannin, as do the products of the action of acids and alkalies, on this glucoside of *Leptandra*.

The watery solution of the alcoholic extract, when freed from alkaloid by means of iodohydrargyrate of potassium, yields but a slight precipitate with tannin until neutralized; but in either case the whole precipitate is soluble in water.

In order to ascertain the presence of this primary glucoside in some other officinal species, and if possible to find a more available and cheaper source for the same, I examined likewise some of the dried herb of *Veronica officinalis* and of *Gra-tiola officinalis*.

Veronica officinalis gathered at the flowering period has been examined by Enz,* who found in the fresh juice, and in an ex-

* Vierteljahresschrift f. Ph. vii. p. 182.

tract from the herb gathered at maturity, a bitter principle soluble in water and alcohol, but scarcely in ether, precipitable by salts of lead but not by tannin; an acrid principle, and a red coloring matter, all contained in the precipitate with neutral acetate of lead, together with malic, tartaric, and citric acids; also acetic and lactic acids and a tannin, striking a green color with iron, a crystallizable, apparently fatty acid, soluble in alcohol and ether, a soft, dark-green, bitter resin, and mannite.

The dry herb which I employed was evidently much changed by keeping. It yielded a large quantity of a moderately bitter extract, which it was necessary to treat with sulphate of soda, to obtain a clear solution. The brown liquid containing the soda salt in solution was separated from the brown tarry precipitate, and reduced to dryness. It was then treated with strong alcohol, and the alcoholic extract evaporated, and re-dissolved in water.

This solution gave only very faint, though indubitable indications of the presence of an alkaloid, the precipitate of iodohydrargyrate requiring a very long time to settle. The yield of saponaceous principle and precipitate with tannin was comparatively very small.

A more abundant yield is procurable from *Gratiola officinalis*, a drastic plant, which furnishes an intensely bitter extract. This plant has been examined by Vauquelin,* by Eugene Marchand,† and repeatedly by Walz.‡

Marchand noticed the precipitation of a bitter principle from the neutral solution by tannin; the glucosides examined by Walz are all obtained in the same manner.

From this plant the saponaceous principle can be obtained in a tolerable state of purity by precipitating the aqueous solution of the residue left on evaporating a tincture prepared with boiling alcohol of 80 p. c. This is treated with animal charcoal, and the decolorized liquid precipitated by baryta, as before described.

New York, June, 1863.

* Bulletin de Pharm. Tome i, p. 481, (1809.)

† From Journ. de Pharm. in Am. Journ. Pharm. xviii. p. 281.

‡ Jahresb. d. Ch. f. 1851, p. 569, and for 1858, p. 518. Vierteljahresschrift f. Pharm. viii. p. 7. Am. Journ. Pharm. xxxi. 340.

NOTES ON THE ALKALOIDS OF MENISPERMUM
CANADENSE.

BY JOHN M. MAISCH.

If we take into consideration the similarity of medical properties of some plants, it is natural to suppose that their proximate constituents are, if not identical, at least closely allied to each other. In plants belonging to the same natural order, or to the same genus, this cannot appear strange, since quite a number of our most active alkaloids, for instance, have been found in more than one, some in numerous, species of the same order.

Many of the organic acids have been found widely distributed through the vegetable world, even those acids which have been considered characteristic of certain genera, like kinic acid for the genus *Cinchona*, appear to be common products of vegetable life, not confined to a single genus or family or allied families, but formed within the cells of plants having no botanical relation whatever. Alkaloids have always been considered as peculiar to a species, or at least as not to wander beyond the limits of the order. When *caffaina* was proved to be identical with *theina*, *psoraleina* and *guaranina*, it was undoubtedly a step which upset some of the ideas, I might say the notions, formed of this class of bodies.

The discovery of *berberina* not only in different families, but in many of the species belonging to these families, (see the interesting paper of Prof. F. F. Mayer, page 97,) is of still greater importance, as all these plants possess decided tonic properties, with a peculiar action on the liver; and because, in perhaps all the species, the *berberina* is accompanied by a white alkaloid, sometimes the latter, in other instances the former, predominating.

The properties, together with some physical appearances, led me first to suppose the presence of *berberina*, and afterwards to satisfy myself of the presence of an alkaloid in the roots of some plants in which it has since been discovered. One of these plants is *Menispermum Canadense*, the long rhizoma of which is used as a tonic, and with its peculiar yellow color suggested the presence of *berberina*, which has previously been discovered in other *Menispermaceæ*.

More than a year ago, I commenced the analysis of this drug, but my other engagements not only forced me to give up the investigation of the other constituents, but have also delayed my examination of the alkaloids, so that I think it better to state the few facts proved so far, and to promise a fuller report as soon as my time shall allow to complete the researches.

The rhizoma contains, contrary to my expectations, only a small proportion of berberina, but a larger quantity of a white alkaloid. The alkaloids may be obtained in an impure state by any of the simple processes for this class of bodies. The following I have found to be the readiest method:

The powder is exhausted with alcohol, the menstruum evaporated, the extract taken up with water and filtered from the resin. The solution is of a yellow color, so that I expected to find a considerable quantity of berberina. But when the liquid is concentrated and mixed with an excess of muriatic acid, but little muriate of berberina is precipitated, and the mother liquor retains its yellow color. This liquid yields with carbonate of soda a bulky precipitate, but the color does not entirely disappear thereby; probably the color of the bark is, to a considerable degree, due to some acid.

If the precipitate is redissolved in muriatic acid, and allowed to evaporate spontaneously, either from an aqueous or alcoholic solution, no crystals appear, but a brownish resinlike mass is left behind. If the alcoholic solution is mixed with ether, a white turbidity, and finally a white precipitate occurs, which retains its color under the liquid in stoppered bottles, but turns brown on drying. This salt contains a white alkaloid, which may be obtained by decomposing its aqueous solution with ammonia and shaking it with ether; on the spontaneous evaporation of the ether, the alkaloid remains behind in the form of a white pulverulent mass, which is generally tinged yellowish brown at the edges. By redissolving this colored portion in muriatic acid, and treating it as before, it will likewise be obtained in a pure white condition.

Besides its solubility in acids, and its precipitability from these solutions by alkalies, the following behavior characterizes this body as a vegetable alkali: It turns tumeric paper brown, and restores the color of reddened litmus; its solutions are pre-

precipitated by tannin, phospho-molybdic acid and iodo-hydrargyrate of potassium. The alkaloid is soluble in ether, alcohol and in much water.

Philadelphia, June, 1863.

NOTE ON PODOPHYLLIN.

BY JOHN M. MAISCH.

The resin of mandrake, as it is met with in commerce, is very variable in appearance: its composition varies in accordance with the mode of its preparation.

Prof. F. F. Mayer mentions in his paper published on page 97, of the present volume, that podophyllum contains berberina. I can corroborate this statement, having prepared it from the mother liquor, from which the resin has subsided.

When the alcoholic tincture is evaporated to a syrupy consistence, and poured with continual agitation into a large quantity of cold water, the sediment after drying will be found of a light-brown color, and to contain the above alkaloid, which may be removed by repeated washings with hot water, during which process, however, the preparation darkens considerably. If the syrupy residue is precipitated by hot water, the resin will separate and fuse at once into a dark-brown cake, which is almost free of berberina, a small portion dissolved in the mother liquor being mechanically enclosed by it.

The mother liquor has an acid reaction, and from it the berberina may be obtained by concentrating it and precipitating muriate of berberina by an excess of muriatic acid. The mother liquor from this precipitation is still of a yellow color, which is due probably to some coloring matter of an acid nature. The muriate of berberina may be purified in the usual manner by dissolving in alcohol.

The resin separating from hot water, settles pretty rapidly, but from cold water it subsides with difficulty, because, most likely, of the slow separation of the native salt of berberina; but if muriatic acid be added to a certain extent, the liquor becomes clear in a short time, since the salts of this vegetable alkali are insoluble in mineral acids. Resin of podophyllum prepared in this way is of a pale greenish-brown color.

It is obvious then from these statements that the so-called podophyllin may, according to the mode of its preparation, contain no alkaloid, a small portion of the native salt, or a larger proportion of muriate of berberina, and that its action upon the animal economy must be modified at least to a certain extent.

I am not aware of any physiological experiments instituted with berberina or any of its chemical combinations. But some of the drugs in which it occurs, are still highly prized as tonics, and are regarded as possessing special action upon the liver; this is, among others, the case with the bark of berberis and with colombo. Podophyllum has long been regarded as a vegetable substitute, to a certain extent, for calomel; and the question arises, whether the pure resin has any action at all upon the liver, or whether it is merely cathartic, being directed to that organ only when combined with berberina? This is a subject requiring investigation by the physiologist; but, to be of any value, the experiments ought to be conducted with the pure principles, and not with a mixture of known and unknown constituents, even if this was commonly called, after the fashion of the eclectics, by a name rightfully belonging to a pure chemical principle.

In the preparation of the resin of podophyllum, by precipitation with water, a considerable quantity of muriate of berberina may afterwards be obtained, and this salt should be collected, because it undoubtedly possesses some therapeutic value. It will be remembered that muriate of berberina is identical with the so-called hydrastine of the eclectics.

Philadelphia, June, 1863.

HISTORY OF THE ORGANIC RADICALS.

BY M. AUGUSTE CAHOURES.

A Lecture delivered before the Chemical Society of Paris, March 30th, 1861.

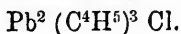
Translated from the French, by W. S. W. RUSCHENBERGER, M. D., U. S. N.

(Concluded from page 221.)

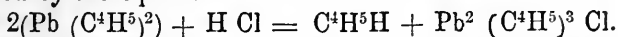
Plumbodiethyl representing the limit of saturation of the compounds which lead forms, we are not surprised to learn that this product like tetrastannethyl, is incapable of uniting with oxygen, chlorine, iodine, &c.

If we warm this liquid with a concentrated solution of chlo-

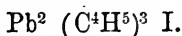
rohydric gas, an inflammable gas is disengaged, and on cooling we see deposited beautiful satiny needles, the composition of which is represented by the formula



The reaction which gives rise to this product may be expressed by the equation



Iodine gives with plumbodiethyl an analogous product represented by the formula

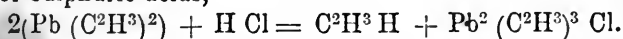


Iodide of ethyl is separated at the same time.

When we employ an excess of iodine we obtain iodide of ethyl and iodide of lead.

I am satisfied for my part that in replacing zinc ethyl by zinc methyl we obtain plumbodimethyl which is formed in like manner by causing the iodide of methyl to act upon an alloy formed of five parts of lead with one of sodium; but the first method is much preferable.

In this way we obtain a very mobile and colorless liquid whose strong and peculiar odor reminds us of camphor and mouldiness. Incapable of uniting either with oxygen or chlorine or iodine, this compound separates in the manner of its ethylated homologue. Similar results are observed when we employ chlorohydric or sulphuric acids,



I merely mention the ethylated and methylated compounds of mercury which Messrs. Frankland, Strecker and Buckton have so completely studied.

A profound examination of these compounds would lead us to conclusions entirely similar to those which we have deduced from the study of the preceding combinations.

Not to consume more of your time, and to demonstrate to you by a last illustration still more conclusive than the preceding, that bodies which act as radicals are complex substances in which saturation is not satisfied, I am about to submit a summary description of the ethylate and methylate compounds formed by bodies of the family of azote, or nitrogen, which will afford us results of the highest interest.

The different simple bodies which constitute this family have a

great tendency to form the two groups



and



Ammonia belongs to the first group, as well as the gases designated under the names phosphuretted, arseniuretted, antimoniuiretted hydrogen. But if these compounds are represented by parallel formulæ, it must be admitted that we do not observe much analogy in their chemical actions; thus, while ammonia unites directly with the strongest acids, and saturates them completely, phosphuretted hydrogen combines only with some acids, and forms very unstable compounds, and the corresponding compounds of arsenic and antimony are entirely incapable of forming saline compounds. But if in those hydrogen compounds we replace all the hydrogen by equivalent proportions of ethyl or of methyl, we obtain the products



which present much more marked analogies.

The addition of a new equivalent of ethyl gives the products



which this time present such resemblances that the history of these different products is found to be based upon one of them.

The tendency which these different products have to fix an equivalent of oxygen, of chlorine, of iodine, &c. to beget compounds which enter into the group



is such that it is necessary to interpose quite energetic forces to destroy the equilibrium of these compounds; thus, the chlorides, bromides, iodides, &c.,



would not be decomposed by a boiling and concentrated ley of caustic potassa.

The corresponding oxides



all possess the most decided alkalinity, and in this respect rival potassa and soda. Like the latter, they restore to blue the reddened tincture of tournsol, disorganize the skin, saturate the most energetic acids, saponify fatty bodies, and behave like

them towards metallic salts. Moreover, compounds formed by these oxides are isomorphous with corresponding compounds of potassium and sodium; it is the same with chlorides, iodides, &c. These analogies are so striking that the most prominent features presented in the history of alkaline metals may be followed in these compounds.

Among these curious compounds, even a very succinct analysis of which would carry me too far, I beg leave to select those referable to arsenic, which I have most especially studied; what I shall say of them may be applied, with slight modifications, to the others.

It is easy to demonstrate that arsenic placed in suitable conditions is susceptible of uniting successively with 1, 2, 3, 4 molecules of methyl to form compounds,



which, not having attained the limit of saturation



are consequently susceptible of uniting with 4, 3, 2, 1, equivalents of oxygen, chlorine, iodine or sulphur, to finally yield compounds at saturation, the physiognomy of which will be very different. Thus if we consider the two extremes we shall have



The first presenting the characters of an energetic acid, while the second offers us such analogy of properties with the alkaline bases that one might be tempted to confound it with potassa or soda.

These different combinations of methyl with arsenic are formed with the greatest facility in the reciprocal action of iodide of methyl and alkaline arseniurets. If we pour iodide of methyl, a little at a time, upon the arseniuret of potassium reduced to powder, and place it in a small globe previously filled with carbonic acid, we immediately perceive a very vivid action, which is manifested by a marked elevation of temperature. The moment this ceases to be produced we distill the mass in a current of inert gas, and collect a mixture of these products, namely:

1st. As Me^2 arsenidimethyl (cacodyl.)

2d. As Me^3 arsentrimethyl.

3d. $\text{As Me}^4 \text{I}$, iodide of arsenimethylum.

The first term, which is nothing but the cacodyl of Bunsen, is easily obtained, as is known, by the distillation of a mixture of

arsenious acid and acetate of potassa entirely deprived of water. We can produce the last in considerable proportion and in an immediate manner by causing iodide of methyl to act on cacodyl; we thus obtain, by crystallization in alcohol, cubes of great beauty, which possess the most perfect resemblance to those of iodide of potassium. The distillation of this substance from fragments of solid potassa yields the intermediate term in a state of entire purity, so that by means of acetate of potassa, iodide of methyl and arsenious acid, we can obtain the three products with the greatest facility.

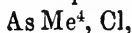
Up to the present time I have been unable to obtain either the term at saturation As Me^5 ,
or the group



the analogue of ammonium, the existence of which we may suppose in the crystallized iodide which we have called iodide of arsenmethylium. But the action of iodide upon the compound

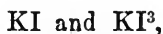


that of chlorine upon the corresponding compound



will afford us the most instructive results, entirely analogous to those which result from the action of these bodies upon distanmethyl or the iodide of sesquistanmethyl, and while enabling us to comprehend the mechanism of the formation of products so varied, impart the most brilliant character of reality to the hypothesis which I announced at the commencement of this lecture on the constitution of organic radicals.

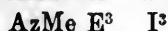
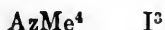
Potassium and sodium being susceptible of forming with iodide the compounds



we should expect to see the iodides

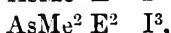
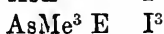
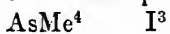


fix two new equivalents of iodine to form analogous compounds, which experiment proves in the most complete manner. Indeed, the researches of M. Veltzien have demonstrated to us the existence of the compounds



Arsenic has furnished me results exactly similar ; all these compounds crystallize in brown needles with metallic lustre, which remind us of the crystals of permanganate of potassa. They are generally slightly soluble in alcohol and in water : ether also dissolves them in slight proportion.

With arsenic I have realized the formation of the five following compounds, which are all isomorphous :



If it be now asked what action heat should exercise upon such compounds, the reply is easy. The affinity of iodine for methyl or ethyl should necessarily determine the separation of these products and bring us back inevitably to the group



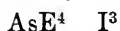
with elimination of a portion of the methyl or of the ethyl under the form of iodide.

Experiment confirms this in the clearest manner.

In submitting to distillation the compounds

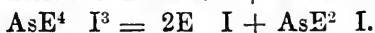


and

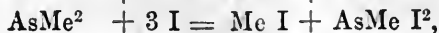
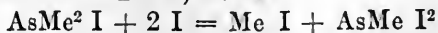


I have obtained in the first case, the iodide of cacodyl, and in the second, iodide of arsendiethyl or ethylic cacodyl ; the iodide of methyl or the iodide of ethyl is disengaged at the same time.

These reactions may be easily explained by means of the following equations :



Hence it is very probable that in causing two equivalents of iodine to act upon one equivalent of iodide of cacodyl, or three equivalents of iodine upon free cacodyl, so as to beget the triiodide, we would separate, under the influence of heat, one equivalent of methyl in the state of iodide, and at the same time would give rise to the iodide of arsenmonomethyl, which experiment fully confirms. Indeed, we have

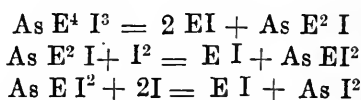


compounds which both belong to the group
 AsX^3 .

If we distil the di-iodide of arsenmonomethyl with two equivalents of iodine, or cause five equivalents of iodine to react on the cacodyl, we obtain in the end iodide of methyl and iodide of arsenic



The ethylic compounds of arsenic have furnished me, as might be anticipated, results entirely comparable to the preceding. Indeed we have

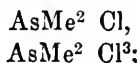


Starting from the ethylic or methylic compound of arsenic which forms the upper term, we then obtain, by the action of increasing proportions of iodine, a series of compounds which all belong to the most stable group



until, by a complete elimination of the alcoholic radical, we finally arrive at the iodide of arsenic, results which agree in such a striking manner with those presented by the ethyluret and methylurets of tin.

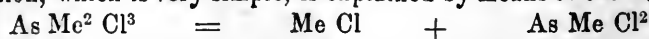
On the other hand we know, according to the admirable work of M. Baeyer, that when we cause chlorine in increasing quantity to act upon cacodyl, we obtain successively the products



which correspond to the groups



The first, which is volatile without decomposition, is the monochloride of cacodyl; if we attempt to distil the second, the equilibrium is not slow to be broken, chloride of methyl is disengaged in the gaseous form, and we obtain a product of more simple composition, which itself soon distils, and which is nothing else than the bichloride of arsenmonomethyl. The reaction, which is very simple, is explained by means of the equation



Trichloride of
Cacodyl

Chloride of
Methyl

Bichloride of
Arsenmonomethyl.

The bichloride of arsenmonomethyl readily absorbs two new equivalents of chlorine, and yields a crystallized product corresponding to the group



which is so unstable that gently warming it is sufficient to cause the separation of the last equivalent of chlorine, in the state of chloride at the same time that the arsenic passes to the condition of trichloride, in this way brought back to the group



which is the maximum of stability for the arsenic compounds.

I have satisfied myself that bromine, as analogies suggest, gives rise to perfectly similar results.

The clear reactions which the ethylic and methylic compounds of arsenic present, most strikingly confirm the views expressed by me at the commencement of this lecture, and which the study of the stannethyls had already clearly exposed, namely: that if bodies which act as radicals present, although complex, all the attributes of simple bodies playing sometimes the part of an electro-negative, and sometimes that of an electro-positive element, of supporter of combustion [comburant] or of combustible, it is that, on the one hand, they possess sufficient stability to enable us to engage them in combinations, and to return again, under the influence of certain forces, without destroying the equilibrium of their molecules, and on the other, the simple substances which compose them not having attained the term of saturation, tend to satisfy it when placed in suitable conditions.

Whenever then we establish contact between a compound formed by a simple body with methyl, or any one of its homologues corresponding to the condition of saturation, and the most electro-negative bodies such as oxygen, chlorine, iodine, &c., it is very evident that these will be incapable of adding to the group which we consider to form oxides, chlorides, iodides. We understand, on the contrary, that by a very simple phenomenon of double decomposition, we shall always be able to eliminate a part of the alcoholic radical in the form of oxide, chloride, &c., while an equivalent proportion of the simple body will take its place to form a product corresponding to the group which has served as the point of departure. Now the

chlorine or iodine introduced in this way into the compound, being susceptible of exchanging with different simple bodies, notably with oxygen, the oxygenated compound being able to unite different acids after the manner of metallic oxides, and to form different salts, we readily explain how the residue ought to present all the appearances of a true elementary substance.

GLEANINGS FROM THE FRENCH JOURNALS.

BY THE EDITOR.

Preparation of (solid) Citrate of Magnesia. By M. de Letter, of Brussels.—All the processes heretofore offered have given a salt soluble at first, but which soon loses more or less of this character by a molecular change.

The following process has given to M. de Letter a citrate of magnesia completely soluble in cold water, and which preserves this quality indefinitely :

Take of Citric acid 20 parts.

Carbonate of magnesia 12 parts.

Pulverize the acid finely, and mix it intimately with the magnesia, also in fine powder. Abandon the mixture at the ordinary temperature during four or five days, or until it ceases to manifest any reaction when a particle is thrown into water. During the reaction, which slowly goes on, the powder swells up and gradually assumes the aspect of a spongy mass. This is dried at the temperature of 86° Fahr., pulverized, and the powder preserved in closely stopped vials.

According to M. de Letter, the solubility of this preparation is due to the absence of water, which in sufficient quantity favors the formation of an insoluble hydrate. The slowness of the operation is due to there being no vehicle to assist the reaction, (except the small amount of water of crystallization in the citric acid,) as well as to the low temperature.—*Journ. de Pharm., Mai, 1863, from Journ. d'Anvers.*

Formation of New Volatile Alkaloids during Putrefaction.—M. Calvert has found that when the gaseous products of the decomposition of flesh and fish are passed through chloride of platinum, a yellowish deposit is formed. Washed with water and

alcohol, and dried, this deposit was found to consist of carbon, hydrogen, nitrogen, and, most remarkable, of sulphur and phosphorus. These researches tend to prove that the noxious vapors disengaged during putrefaction, contain the nitrogen, sulphur and phosphorus of the animal matter, and that these elements are not set at liberty, as ammonia, and sulphuretted and phosphuretted hydrogen, which bodies were not met with in these experiments.—*Journ. de Chim. Méd., Mai, 1862.*

Borate of Copper as a Substitute for Scheele's Green.—M. Bollaÿ, (*Jour. de Chim. Méd.*) suggests this salt as a coloring substance, less poisonous than arsenite of copper, and more beautiful than oxide of chrome, or green ultramarine.

It is prepared by dissolving sulphate of copper and borax in the relation of their equivalents, (16 to 24,) and mixing the solutions, collecting the pale green precipitate, washing it with very cold water, drying, and subsequently heating in a crucible to a dull red heat. All the water is thus driven off, and its shade becomes deeper or lighter green, according to the continuance of the heat.

Spirit of Mustard, (Alcool Sinapique.)—M. Martin Barbet, of Bordeaux, makes this preparation by macerating during two hours 250 grammes of black mustard flour in 500 grammes of cold water; then adds 120 grammes of alcohol, 86 per cent., and distills to obtain 120 grammes of liquid. Thus made, spirit of mustard is much cheaper than that obtained by the solution of the oil in alcohol, and equally active.—*Journ. de Chim. Méd.*

Alteration Produced on Linen by Syrups.—According to M. P. Doré, syrups in general, and especially simple syrup, deposited on linen and exposed in a place where the temperature is moderate, becomes dry, and deprives the linen of its flexibility and tenacity to a degree that will cause it to tear under a feeble effort. On examination of the rent, the linen appears as though it had been touched with a corrosive liquid, like diluted SO_3 . In this case the flexibility and tenacity of the filaments disappear, and their nature altered as when linen is frozen in water.—*Journ. de Chim. Méd., Mai, 1863.*

On the Ethereal Juices of Poisonous Plants, and on the Ap-

proximate Testing of Alkaloids in their Extracts. By M. Lepage, of Gisors.—Professor Bouchardat proposed, more than a dozen years ago, the employment of sulphuric ether for the preservation of the juices of active plants with all their properties. This method, which does not appear to have received much attention, doubtless because it has not been sufficiently tried, is, nevertheless, *excellent*, as I have found on many occasions.

In proof of this, I have prepared the extract of Belladonna from the juice of this plant obtained in the *month of June, 1852*, and preserved to this time, by means of ether, that is *more than ten years*. The juice, after being heated in a water bath to deprive it of ether, offers the characteristic odor of the fresh juice of belladonna. A litre ($2\frac{1}{3}$ pints) yielded 22 grammes of extract, possessing exactly the chemical, physical, and physiological properties of extract prepared with the juice of the same plant recently obtained.

These juices when long kept deposit a large part of their earthy salts, which is unimportant. The author thinks them preparations of sufficient importance to deserve the attention of the revisors of the French Codex, both for separate use and for the preparation of extracts.

The author suggests the following method of testing chemically and quickly the value of an extract containing an alkaloid. Take one gramme ($15\frac{1}{2}$ grs.) of the extract, dissolve it in double its weight of distilled water, put the solution in a test-tube and add from 25 to 30 centigrammes (4 to 5 grs.) of bicarbonate of potassa pulverized. When all sign of effervescence has ceased, 5 or 6 times its volume of pure ether is thrown on the mixture, closely stopped, and shaken quickly for two or three minutes—several times. After subsidence, the ether is decanted into a capsule and allowed to evaporate. The amber colored residue is dissolved in six or eight grammes of water, acidulated with one or two drops of muriatic acid. This solution is nearly colorless, and should be precipitated decidedly by iodohydrargyrate of potassium, and yield a flocculent precipitate with a solution of tannin, if the extract is of the full strength.

By comparing the volume of these precipitates, with those of

an extract known to be of standard strength, a fair judgment can be obtained.—*Journ. de Pharm., Mai*, 1863. [The result would be more exact of the method of Prof. Mayer (see page 20 of this volume) were followed.—ED. AM. J. PH.]

On the chemical composition of Rosa Gallica. By M. Filhol.—The author published last year a work relative to the coloring matter of flowers, in which the occurrence of quercitrin was noted. In again examining the flowers of the red rose, he has ascertained that their astringent property ought to be attributed in great degree to the quercitrin, and that but traces of true tannin can be found. When the petals, coarsely powdered, are exhausted with ether, a yellow tincture is obtained, the flowers retaining their beautiful red color. The ethereal tincture by evaporation yields a soft greenish yellow extract. Boiling water dissolves a part of this, forming a yellow solution, whilst a greenish fatty matter is left. This solution gives a deep bottle green precipitate, with persalts of iron. It is colored bright yellow by alkalis, and gives, with lead salts, lakes of an intense yellow color; and lastly, when evaporated to dryness, it leaves a dry residue, which assumes a lively yellow tint when moistened with strong hydrochloric acid. Quercitrin may be isolated from the lead precipitate.

Rose leaves contain also a large portion of uncrystallizable sugar (20 per cent.), some cyanin, and gallic acid.—*Repert. de Pharmacie, Mai*, 1863.

Preparation of Crystallized Sulphate of Atropia. By M. J. Laneau.—Heretofore, commercial Sulphate of Atropia has been almost wholly in powder,—a circumstance not favorable to its commercial purity; and M. Laneau, deeming that an agent so important in ophthalmic surgery should be of unquestioned purity, offers the following formula for its production in crystals:

Take of Crystallized Atropia	.	.	289 grains,
Absolute Alcohol	.	.	800 "

The solution is effected by agitation in a glass capsule, aided by a very gentle heat. Then weigh in a small phial.

Sulphuric acid (sp. gr. 1.85	.	.	40 grains.
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Dilute this acid with 300 grains of anhydrous alcohol, and add it little by little to the solution of Atropia. To complete

the saturation the solution is stirred with a glass rod moistened slightly with concentrated alcohol, until test paper shows neutrality. The solution is then suffered to evaporate spontaneously. The crystallization is effected in three or four days in the summer, or five or six days in winter. The thinner the stratum of liquid, the more quickly is the process effected. The crystals, which may be dried without destroying their form, are in colorless needles more or less interlaced. When chloroform is used instead of alcohol, the salt is obtained in a gum-like mass. Crystallized Sulphate of Atropia is soluble in water, weak alcohol and absolute alcohol, but is insoluble in chloroform and ether.—*Repert. de Pharm.; Mai*, 1863.

NOTE ON THE ORDEAL BEAN OF CALABAR.

(*PHYSOSTIGMA VENENOSUM*, Balf.)

BY DANIEL HANBURY, F. L. S.

The recent experiments of Drs. Argyll Robertson, Fraser, Stewart, Messrs. Bowman, Wells, and others on the Ordeal Bean of Calabar* and the fact elicited by these experiments that it possesses the peculiar power of causing the sphincter pupillæ and ciliary muscle to contract, render it probable that this remarkable seed will find a useful application in ophthalmic medicine; and the present moment is therefore appropriate for reviewing some of the facts hitherto ascertained respecting it.

The first important notice on the subject is contained in a most interesting and valuable paper by Dr. Christison read before the Royal Society of Edinburgh, February 5, 1855. In this paper the author, after alluding to various vegetable substances used by the natives of tropical Western Africa in ordeal by poison, describes as one of pre-eminent virulence, a large leguminous seed called *Eséré* used by the negroes of Old Calabar, in the Gulf of Guinea. This seed which Dr. Christison called the *Ordeal Bean of Old Calabar*, and the botanical origin of which was at that time unknown, was the subject of some remarkable toxicological experiments which amply proved

* Edinburgh Medical Journ. March, 1863; Medical Times and Gazette, May 16th, 1863.

it to possess powers of no ordinary character. Dr. Christison also made some experiments on the seed with the view of isolating its active proximate principle, but was unsuccessful, partly owing, it is probable, to the limited amount of material at his disposal. "All I can say," he observes, "is that the seed like others of its natural order contains much inert starch and legumin, and 1.3 per cent. of fixed oil, also probably inert; that its active properties may be concentrated in an alcoholic extract, which constitutes 2.7 per cent. of the seed; and that this extract does not yield a vegetable alkaloid by the more simple of the ordinary methods of analysis."*

Some of the Ordeal Beans in Dr. Christison's possession having been placed in earth, germinated in the Botanic Garden of Edinburgh, and in the garden of Professor Syme, producing vigorous plants; but as these did not flower, no determination of the genus to which the plant belonged could be made. At length about the year 1859, the Rev. W. C. Thomson of Old Calabar, a good botanical observer, was so fortunate as to obtain, after many trials, complete and excellent specimens of the plant, some of which, preserved in fluid, were communicated to Mr. Andrew Murray and Professor Balfour. Their examination devolved chiefly on the latter gentleman, who on January 16, 1860, read before the Royal Society of Edinburgh a *Description of the Plant which produces the Ordeal Bean of Calabar*, which, illustrated by two plates, was subsequently published in the Society's *Transactions*.†

The Ordeal Bean belongs to the natural order *Leguminosæ*, the sub-order *Papilionaceæ* and tribe *Phaseoleæ*; but subordinate to this, its characters have been considered sufficiently peculiar to warrant the formation of a special genus for its reception. This has accordingly been done, the new genus receiving from Dr. Balfour the name of *Physostigma*,‡ and the one species which it contains, that of *venenosum*.

* Pharm. Journ. vol. xiv. (1855), p. 472.

† Vol. xxii. p. 305.

‡ From *φυσίζω* to *inflate*, and *στίγμα*. The genus is thus defined.—Calyx campanulatus, apice quadrifidus, laciniis brevibus, lacinia suprema bifida. Corolla crescentiformis, papilionacea; vexillum recurvum, apice bilobatum, basi angustatum, margine utroque auriculatum, membranâ

The most remarkable character of the genus *Physostigma* is that derived from the stigma, which possesses a singular, crescent-shaped, hooded appendage. By this character and the long grooved hilum of the seed, it is separated from the nearly allied genus *Phaseolus*; and from *Mucura*, to which its seed bears considerable resemblance, by the characters of its flowers and pod; from *Canavalia* by its diadelphous stamens and other characters; and from *Lablab*, by its phaseoloid carina and pistil.

Physostigma venenosum, the Ordeal Bean, is a large climbing perennial with a woody stem of two inches diameter and sometimes fifty feet in length. Its large leaves are pinnately trifoliate, with ovate acuminate leaflets. Its papilionaceous flowers are in pendulous racemes, the stalk or rachis of which is covered with tuber-like knots; each flower is about an inch in length, and of a pale-pink or purplish color, beautifully veined. The legume when full-grown is about seven inches in length, elliptico-oblong with a short curved point stipitate, dehiscent and containing two or three seeds. The seeds which are oblong or somewhat reniform, are from 1 to $1\frac{3}{8}$ inches in length by about $\frac{3}{4}$ of an inch in breadth; their convex edge marked by a long sulcate hilum, extending as a deep furrow from one extremity of the seed to beyond the other. The exterior of the seed is somewhat rough with a dull polish; its color is a deep chocolate-brown, somewhat lighter on the raised edges of the furrow. The seeds weigh, on an average of twenty, 67 grains.

The Ordeal Bean is difficult to obtain even near the localities where it is produced. Dr. Christison states upon the authority of the Rev. H. M. Waddell of Old Calabar, that "the plant is

inflexâ auctum, media longitudinaliter bicallosum; alæ obovato-oblongæ, liberæ, supra carinam conniventes, versus basin appendiculatæ. Discus vaginifer. Ovarium stipitatum, 2-3-ovulatum. Stylus cum carina tortus, infra stigma subtus barbatus; stigma obtusum cucullo cavo oblique tectum. Legumen dehiscens, oligospermum, elliptico-oblongum, subcompressum, extus rugosum, endocarpium intus telâ laxâ cellulari tectum, isthmis cellulosis inter semina. Semina strophilata, hemisphærico-oblonga, hilo latesulcato semicincta.

Herbæ suffruticosæ volubiles in Africa occidentali tropica crescentes: foliis pinnatim-trifoliolatis, stipellatis, floribus nodoso-racemosis, purpureis.

everywhere destroyed by order of the king, except when it is preserved for supplying the wants of justice,—and that the only store of seeds is in the king's custody." Whether this remains to be the fact, I know not; but Mr. Gustav Mann, Collector to the Royal Gardens, Kew, to whom I wrote some time ago requesting a supply of the beans, remarked in a letter under date Nov. 24, 1861, that he had been able to procure but few, "as the people do not like to give them to Europeans." There is no reason, however, to suppose that this reluctance will continue if a good money-value become attached to them.

The best form in which to employ the Ordeal Bean as a medicine is a point of importance to the pharmacist, but one upon which further experience is required. Dr. Christison found that the active matter of the bean could be separated by alcohol, and he obtained (as already stated) 2.7 per cent. of extract by this menstruum. I found that upon reducing the bean to coarse powder and exhausting it with cold alcohol (sp. gr. .838), 2.3 per cent. of dry extract was obtained; and upon further exhausting the residue with similar alcohol at a boiling temperature, a further product of extract amounting to 2.2 per cent. Whether these extracts are alike in power is at present hardly proved, but the result of a single experiment appears to show that the second is as powerful as the first. The alcoholic extract rubbed down with water, forms a turbid liquid, which however efficient, is certainly not an elegant preparation, and it has been said rapidly to spoil. It has been prepared of several strengths, so that one minim may represent $\frac{1}{2}$, 1, 2, or 4 grains of the bean. In glycerine, the alcoholic extract dissolves freely, yielding a tolerably clear solution; and if this menstruum be unobjectionable as an application to the eye, it will certainly prove convenient pharmaceutically, as it affords a solution not liable to change by keeping.

The residue of the bean, after the extract had been obtained as above described, was dried; and with the view of ascertaining whether it still contained a poisonous principle, some of it, mixed with bread and lard, was administered to a mouse and rat. Neither animal would eat the mixture very readily; the mouse after some hours ate a pellet containing five grains of the residue, and died in the course of the next day. To the rat, which at intervals ate a much larger quantity, the residue also proved

fatal in about forty hours. These experiments show that the bean had not been entirely deprived of its active properties.—*London Pharm. Journ.*, June, 1863.

RENDERING CERTAIN SUBSTANCES LESS PERVIOUS TO
THE AIR AND LIQUIDS,—PROTECTION OF METALLIC
SURFACES, &c.

BY J. STENHOUSE, Barnsbury Road, London. Dated Jan. 21st, 1862.

For the applications severally described in the headings, Dr. Stenhouse employs a paraffin, either in a melted state alone, or dissolved in a suitable solvent, which may be one of the following:—coal tar, naphtha, petroleum, or bisulphide of carbon. The mode of using this substance varies with the object in view. When applied to cloth or other textile fabrics, for the purpose of rendering them waterproof, these materials are stretched upon a frame, and laid face downwards upon a clean, flat, metallic surface, an iron plate for instance, which is heated by steam or direct fire to a temperature between 130 and 250 degrees Fahrenheit. As soon as the cloth has become sufficiently warmed through, a large block of solid paraffin is rubbed over the wrong side of the cloth, and this surface coated as evenly as possible. In order then to distribute the paraffin among the fibres, or force it into the substance of the cloth, a hot flat-iron is passed over it, or lengths of the material pressed between hot rollers, and when the impregnation is completely effected the cloth is removed and allowed to cool.

A similar mode of proceeding may be carried out in the treatment of leather, fur, felt, silk, calico; and trifling modifications in the mechanical arrangements will permit of its adaptation to rope and hempen goods, thread, and artificial flowers.

In protecting metallic surfaces, the patentee employs paraffin, melted or dissolved as before, for coating all kinds of gilded or tinselled articles, especially those covered with dutch gold, silver leaf, bronze powders, and tin or copper foil.

By the process of Dr. Stenhouse it is easy to confer upon cloth any acquired degree or character of water-proofing; the use of a small proportion of paraffin appears to have great power in enabling the fabric to repel moisture, whilst a more thorough treatment effectually closes the interstices of the cloth against rain or water.—*Chem. News, Lond.*, May, 16th 1863.

NEW ISINGLASS ADHESIVE PLASTER.

BY E. ANDREWS, M. D.

Professor of Surgery in the Chicago Medical College.

The adhesive plasters in use, consist, almost exclusively, of two kinds: the emplastrum adhæsivum of the Pharmacopœia and the isinglass plaster. The advantages and disadvantages of these articles are the following:—

1st. The emplastrum adhæsivum of the Pharmacopœia:—This long used plaster has the merit of being strong and cheap. Its disadvantages are, that the turpentine in its composition is apt to irritate and even blister delicate integuments. If it is kept on hand too long, it becomes dry and will not adhere; and in military practice, if the weather is cold, the impossibility of warming the strips on the field, renders the article worthless. The common idea, that it resists moisture, on account of its resinous composition, is erroneous, as it loosens from the skin with the steady application of water, as entirely as any isinglass.

As an improvement on this old standard article, we have several varieties of isinglass plaster from different manufacturers. These differ somewhat among themselves, but are all essentially alike in appearance and use. They, apparently, consist of some form of gelatin applied to a thin, delicate slip. The plasters thus made, are thin, transparent, and adhere well. Their advantages are, that they are extremely elegant, on account of their delicate transparency, that they do not change by keeping, that they adhere readily and quickly by simply moistening the surface without requiring heat, and can be as readily removed by application of water again. Moreover, they do not irritate the most delicate skin. These qualities fit them admirably for all the lighter operations of surgery; but for the heavier work, such as extension and counter-extension in fractures of the femur, and strapping in fractures of the clavicle, they are entirely worthless, for the following reasons:—

1st. The material on which the glue is laid is too fragile, and has not strength enough to sustain the tension required.

2d. The articles, as now sold, are in too small pieces. The rolls are about nine inches wide, and purport to be a yard long,

but are, generally, by the villany of somebody, found to be short of even that small measure. For adhesive-strap dressing of the clavicle, two strips are required, each two and a half inches wide and one and a half yards in length; and for adhesive-strap counter-extension, according to my method, in fractures of the femur, two strips are required, each two yards in length and three inches in width, besides the extension-straps and the belt-strap. No such strips can be cut from the articles now sold, except by piecing them together.

3d. The expense of the article is very heavy. These little miserable patches of plaster, each one less than a quarter of a square yard in area, are retailed to physicians at the extortionate price of a dollar each. Now, even if it were possible to use them in heavy surgery, the cost would be a serious objection. A quantity sufficient to make a solid adhesive-strap extension and counter-extension on an adult fractured femur, would come to, at least, three dollars.

For these reasons, I have requested several apothecaries to produce a new article, which should have the strength and cheapness of the old plaster, with the advantage of the gelatin surface.

Mr. Dillingham, of State street, has been kind enough to carry his experiments to a successful issue. He has produced an article of gelatin plaster laid on linen, which is in large rolls of about the same width as the old emplastrum adhæsivum, and which he sells at the extremely low rate of twenty-five cents a yard, being by far the cheapest and best article in the market for heavy surgical work. This plaster has strength enough for any purpose required, and adheres to the surface with unequalled tenacity. It is also perfectly adapted to the closure of ordinary incised wounds, and to every other purpose that any plaster serves. It combines the following advantages, viz., cheapness, strength, adhesiveness, and freedom from irritation.

As it is not a patent article, and there is no secret about its composition, I trust that our large manufacturers will, by and by, come down from their high stilts, and consent to produce for the profession some similar preparation, capable of being used for the work we have to do, and at a price which is less preposterous than what we have heretofore paid.—*Chicago Med. Examiner*, Feb., 1863.

BLACK MUSTARD SEED.

Will & Kœrner (*Annalen der Chemie u. Pharm.*, Bd. 125, Marz, 1863,) have published a paper on the mode of formation of the volatile oil from black mustard seed. The body, by the decomposition of which the essential oil is formed, was found by Bussy to be the potassa salt of myronic acid, which with myrosin, the peculiar ferment of the seeds, and water, or by the action of acids, yields the oil and a few other products. Among the latter are sulphur, sulphuric acid, sugar, cyanide of allyl. The last named substance by the action of potassa is converted into ammonia, a volatile fatty acid, of the same composition and probably identical with the crotonic acid obtained from croton oil. The cyanide of allyl also forms from the essential oil of mustard (sulphocyanide of allyl) when in contact with the water, sulphur being disengaged, and it is a constant constituent of the commercial oil; it is much lighter than water, and boils at 245 degrees Fahr., while the true oil of mustard boils at 290 degrees, and sinks in water.—*Druggists' Circular*, May, 1863.

CORTEX MUSENÆ.

This bark was formerly known in commerce as *Cortex Brayeræ anthelminticæ*, under the belief that it was that of the tree, the flowers of which are known as Koosso. The source of this bark has long remained in doubt, and the plant from which it is obtained, a tree, was placed in the order of leguminosæ, until Buckner, Hochstetter, and Steudel proved it to be the *Rottlera Schimperii* (Nat. Ord. *Euphorbiaceæ*, Sect., *Crotonææ*), a large tree of Abyssinia. The bark of this tree mixed with koosso, is employed in that country for the treatment of tape-worm. Musena bark, as it occurs in commerce, is in quills of several inches in length, from one to two inches in width, the outer surface very uneven, rough, and fissured, the epidermis of a brown color, underneath which there is a very thin greenish cellular coat overlying a comparatively thick periderm of a pale yellow color and hard granular structure, and beneath this the liber of a very tough and long fibrated tissue. It possesses no odor; the periderm has little taste, while the liber possesses a peculiar sweetish nauseating one, and causes an acrid, long continuing

sensation in the fauces. C. Thiel, who has lately examined this drug, found as the active ingredient, a non-crystallisable substance of a very acrid taste, having many properties in common with saponin, but distinguished from it by a greater solubility in alcohol. Besides this, the musena bark contains a fatty wax-like substance, a yellowing coloring matter, extractive, and a bitter principle. It yields $5\frac{1}{2}$ p. c. of ashes, consisting of potassa, soda, lime, magnesia, sesquioxyd of iron, hydrochloric, sulphuric, phosphoric, carbonic, and a large quantity of silicic acid. Very little is known as to the therapeutical action of the drug. Girtler, of Vienna, has prepared an alcoholic extract, which is now being tried by the profession.—*Neues Jahrb. f. Pharm.* Bd. xviii., January, 1863, p. 374, from *Druggists' Circular*.

WINES ON THE RHINE.

From Bonn to Coblentz, and from this city to Mayence, the country is covered with vineyards, although to the north of this the vines are of little comparative note. The latitude of this city is nearly 51° corresponding with the northern shores of Newfoundland, or the southern borders of the Hudson's Bay: and yet the finest and most aromatic wines of the world are the product of this favored region. Nowhere, indeed, is the fondness for vine cultivation more evident in every grade and class of farmers than in the vine districts bordering on this river and its tributaries. The humblest peasant has his little vineyard. Every accessible spot on the declivities and among the rocks and precipices with an auspicious aspect, is decorated with the favorite plant. Owing to the sloping banks, from Mayence to Bonn, the vineyards on either side of the Rhine are in full view, and in no other country on the globe are they seen to such advantage. Here is Erbach enthroned among vines; here the Rheingau, with its famed Johannisberg seated on a crescent hill of red soil, with every cranny cultivated that admits of vegetation; here are Mittleheim, Geisenheim, and Dudenheim, the last with its strong fine-bodied wine, the grapes basking on their promontory of rock in the warm summer sun, imbibing its generous heat from dawn to setting; and then again on the other

side is old Bingen, celebrated in song, delightful, sober, majestic, adorned on every side by its terraces of vines; the summits of the lofty hills and crags everywhere crowned with feudal relics or monastic remains. At Coblenz the soil becomes particularly well adapted for the cultivation of the grape, though the right bank of the river is most noted for its wines. The *Rheingau*, the most celebrated of all the wine growing districts, consists of an area of ten miles in length by four in breadth, which has been known for many centuries for the excellent quality of its produce. The valley of the Rhine, taking from Mayence a western and north-western course, exposes it to the warm south-west winds, which have a very salutary effect on the maturity of the grape. The Riessling, a small white grape, is the one chiefly cultivated here; and although not well adapted for the table, has a finer and more aromatic *bouquet*, it is said, than any other grape known. It is in the centre of this district, on a gentle eminence on the right bank of the Rhine, and in plain view from the river, that the celebrated Johannisberg vineyard is situated. This small domain of only forty acres in extent, yields on an average about 9600 gallons of white wine annually, selling in 1859, at public sale, for 60,000 dollars. I am told that four qualities of wine are produced from this vineyard, the best selling for over seven dollars per bottle, or twelve thousand florins (\$6000) per ton. The price of the different qualities varies from \$1.50 to \$7 per bottle. It is sometimes sold, however, by the cask, especially in bad years. The cellars or vaults are very extensive, but it is difficult to gain admittance to them. There are no gardens attached to the Chateau, as the ground is too valuable, nor are there any trees, except on the north side of the house, where is a sort of wilderness of limited extent. The best wine, I am informed, is the product of vines growing close under the Chateau, and, indeed, partly over the cellars. The rare excellence of the wines of this district is generally accounted for from advantageous exposure to the direct rays of the sun, and the peculiar qualities of the slaty soil, which retains the heat of the sun's rays, so necessary for bringing the grape to maturity. This is proved by the fact already stated, that the best wines are confined to the north bank of the river, the valley being completely sheltered from north and east winds by the interve

ning barrier of mountains. A good deal, however, is evidently owing to the careful management of the vines, and the great care bestowed on the vintage. The grapes, for instance, are allowed to remain on the vines as long as they can hold together, and the vintage never takes place till the grapes are more than perfectly mature. The vineyard is divided into small compartments, the produce of each of which is put into separate casks, and even in the best years there is a difference in the value of different casks. In bad years the wine never goes into the cellars, but sells at once for what it will fetch. The best of the Rhine wines, after being fermented in casks, are repeatedly racked, and then suffered to remain for years in large reservoirs to acquire perfection by time. These huge casks contain 350 tuns. The Germans have always held that wines mellow best in large vessels, hence the celebrated Heidelberg tun, 31 feet long by 21 high and holding 600 hogsheads. Hence, also, the enormous tuns of Tübingen, Gruningen, and Königstein, the last of which contains 3709 hogsheads. All these tuns were formerly kept carefully filled. Some of these I have examined, but could not ascertain that they had been filled for many years past. I have mentioned the Riessling grape, but there are also the Klimberger, the Traminer, and the Orleans variety, all of which are cultivated in the Rheingau and produce excellent wines.—*Correspondence of Prof. Charles A. Lee, in the Am. Med. Times.*

TEST FOR CHOLESTERIN.

Hugo Schiff describes the following reaction of cholesterin (*Annalen d. Chem. und Pharm.* Bd. cxv. s. 313). If cholesterin be moistened with hydrochloric or sulphuric acid containing perchloride of iron, it becomes of a magnificent violet color. A mixture of two or three volumes of concentrated hydrochloric or sulphuric acid and one of a dilute solution of the perchloride will answer for the experiment, or even the ordinary commercial hydrochloric acid. A small piece of cholesterin should be rubbed by means of a glass rod with a drop of the reagent, and the mixture then gently warmed. It first becomes of a reddish, which as the temperature rises changes to a blue violet, color. When sulphuric acid is used the mixture must be warmed more

cautiously. It first becomes carmine red, then violet, and at a high temperature is carbonized. Nitric and phosphoric acid with the perchloride of iron will not give the reaction.—*Druggists' Circular.*

ON THE MANUFACTURE OF NICKEL.

By LEWIS THOMPSON, M. R. C. S. &c.

Commercial nickel is a very impure article, and bears no more relation to pure nickel than brass or bell-metal does to copper. The following table will show its average composition, as it is found in the market:—

	English.	English.	German.	German.	French.
Nickel.....	86.0	84.5	75.7	80.9	77.5
Cobalt.....	6.5	8.2	2.2	5.2	3.7
Copper.....	—	0.6	12.5	7.7	10.2
Iron.....	1.4	1.1	0.4	1.2	1.1
Arsenic.....	1.3	0.4	2.6	3.8	2.8
Zinc.....	2.0	0.7	4.1	0.5	1.4
Manganese.....	0.2	0.8	—	—	0.6
Sulphur.....	1.7	2.2	2.3	0.2	1.1
Carbon.....	0.5	0.9	0.2	0.1	0.7
Silica and Alumina.....	0.4	0.6	—	0.4	0.9

From what I have before said, there is every reason to suppose that our accounts of metallic nickel relate to an alloy of that metal with cobalt, in greater or smaller proportion; that, in fact, absolutely pure nickel has not hitherto been obtained. Pure nickel is, however, much more easily made than pure cobalt, for its affinity for oxygen is much less. Taking advantage of this fact, I made up a quantity of pure oxide of nickel into a paste by means of a little water, and forced this paste through a perforated earthenware plate, so as to form it into a granulated mass; when this mass had been thoroughly dried, I introduced it into a porcelain tube, and after heating it red hot, I passed a current of pure hydrogen gas over it, and continued this until it had become cold. The gray metallic sponge thus produced was fused with a little borax in a crucible, lined with pure alumina, and yielded a beautiful white silvery looking button of the weight of 620 grains; its specific gravity was 8.575, and it was almost as soft as copper. Its malleability

seemed very great indeed, for a piece of it was rolled out nearly to the thinness of tin foil ; it showed, however, a disposition to tarnish after a few days' exposure to the air, and become then of a pale yellow color—a kind of green-sickness tinge. Its magnetic properties were less decided than those of either cobalt or iron ; and judging by the globular form and other evidences of perfect fusion in the button, I believe that the nickel is much more fusible than the two metals just mentioned. When portions of it were melted with copper and zinc, in the quantities usually adopted to form albata, it produced a compound vastly superior in appearance to any of the miserable make-shifts that now disgrace our markets. Indeed, I am quite convinced that it would well repay any respectable person to commence the manufacture of pure nickel ; and it would not surprise me, if a compound of aluminium and nickel could be formed, which, for beauty of appearance, might equal silver, and surpass it in durability and freedom from sulphurous deterioration.

Whilst alluding to the advantages of an improvement in the manufacture of nickel, it may not be amiss for me to notice two points of some importance in the way of improvement. At present the extraction of nickel from the ore is made to depend very much upon the affinity of arsenic for that metal, so as to form with it an arseniuret of easy fusibility and sufficient specific gravity to separate freely from the melted slag or gangue ; and for this purpose large quantities of arsenic are employed by the workmen, not only to the detriment of their own health, but also to the injury of their neighbors. This pernicious practice is quite unnecessary, as I have myself proved by experiments upon a large scale ; for example, after carefully roasting six hundred weight of common ore of nickel, which is an arsenio-sulphuret, I mixed it with half its weight of chalk, and threw the mixture into a cupilo furnace in full blast ; the result was, that the lime of the chalk formed, with the quartz and oxide of iron in the ore, a perfect flux, whilst the oxide of nickel, being easily reduced to the metallic state, fell, in that condition, into the well of the cupilo, from whence it was run out in a melted form, and readily separated from the slag. There was no appreciable loss of nickel in this operation, and the rough metal was found to contain 88 per cent. of pure

nickel, the rest being cobalt and iron, with a little sulphur, but no arsenic could be detected in it; moreover, this rough metal might, from the cheapness of the process, have been profitably sold at 3s. per lb., and was decidedly more pure than the ordinary commercial nickel.

The other point to which I have alluded is applicable to the wet mode of separating nickel, and depends upon a fact hitherto, I believe, unnoticed by chemists. If we have in solution a mixture of the sulphates of nickel, cobalt, zinc, manganese, iron, and copper, we have only to add to this solution in a warm state, as much sulphate of ammonia as it will dissolve, and then set it aside to cool. Almost every particle of the nickel and cobalt will separate as a green crystallized powder, and leave the other metals in solution. The explanation is very simple. The sulphates of nickel and cobalt form triple salts or alums with the sulphate of ammonia, and these salts are absolutely insoluble in a cold saturated solution of sulphate of ammonia, particularly when this solution is slightly acidulous. I shall conclude these remarks upon nickel by stating that this metal appears to possess the property of "welding" like iron. At my request, a workman heated two small bars of nickel, which had been previously powdered over with borax, the bars were heated in a forge, and the two hot ends "jumped" together, that is to say, the white hot ends were forcibly driven one against the other by gentle blows with a hammer, applied to the other ends, the symmetry of the bar being preserved by blows applied laterally. Although the point of junction was afterwards subjected to much twisting, straining, and so forth, with a view to test its cohesive power, yet it showed no signs of weakness, even after much cold hammering.—*Journ. Frank. Institute, May, 1863, from Newton's London Journal, February, 1863.*

PROHIBITION OF CALOMEL AND TARTAR EMETIC IN THE ARMY.

Surgeon-General's Office,
Washington City, D. C., May 4, 1863.

I. From the reports of Medical Inspectors and the Sanitary reports to this office, it appears that the administration of calomel has so frequently been pushed to excess by military sur-

geons as to call for prompt steps by this office to correct this abuse; an abuse, the melancholy effects of which, as officially reported, have exhibited themselves not only in innumerable cases of profuse salivation, but in the not infrequent occurrence of mercurial gangrene.

It seeming impossible in any other manner to properly restrict the use of this powerful agent, it is directed that it be struck from the supply table, and that no further requisitions for this medicine be approved by Medical Directors. This is done with the more confidence, as modern pathology has proved the impropriety of the use of mercury in very many of those diseases in which it was formerly unfailingly administered.

II. The records of this office having conclusively proved that diseases prevalent in the army may be treated as efficiently without tartar emetic as therewith, and the fact of its remaining upon the supply table being a tacit invitation to its use, tartar emetic is also struck from the supply table of the army.

No doubt can exist that more harm has resulted from the misuse of both these agents, in the treatment of disease, than benefit from their proper administration.

W. A. HAMMOND, Surg. Gen.

Amer. Drug. Cir., June, 1863.

THE BITTER PRINCIPLE OF GENTIAN.

Chemists have long failed to discover or isolate the body to which gentian owes its purely bitter taste, though there has been eliminated an acid principle, gentianic acid. Ludwig and Kromayer have at last obtained it from an alcoholic extract of the fresh root of gentian (*lutea*), the watery solution of which transferred its bitterness to animal charcoal by two successive treatments. The charcoal was extracted with alcohol, the tincture evaporated, the residue freed from precipitable matter by means of oxide of lead, and after removal of the latter by sulphuretted hydrogen, evaporated to the consistence of a syrup; the latter precipitated the principle by agitation with ether. This *gentiopicroin* is crystallizable, is readily soluble in water and alcohol but not in ether, neutral, and not precipitated either by tannin or subacetate of lead. It is a glucoside, for contact

with mineral acids, as well as oxalic and acetic acids, splits it into fermentable sugar and a brownish, yellow, amorphous body, *gentiogenin*. The formula $C_{40}H_{30}O_{24}$ for gentiopicroin requires

Carbon,	51.948 p. c.
Hydrogen,	6.494
Oxygen,	41.558.

—*Amer. Drug. Cir. from Sitzungsber. Wien. Akademie, Bd. xlv., Januar. 1862, in Chem. Centralblatt, 1863.*

ARTIFICIAL INDIA-RUBBER.

In the chemical department of the Sheffield Literary and Philosophical Society were shown specimens of a new and valuable invention, patented by Mr. A. Parkes, of Birmingham, and called after him "Parkesine." It is a compound of oil, chloride of sulphur, and collodion, and may be used as India-rubber and gutta-percha. In its plastic state it is easily pressed into molds, and when set becomes hard and durable. It may be produced of any color, and also made to imitate ivory. If this latter substance can be successfully imitated, Mr. Parkes will have accomplished what many men have long tried to do, and on which some have in vain sacrificed fortune and health. The inventor only shows the articles as the work of an amateur, and to give some idea of the capabilities of the material, which he says can be produced in quantities at 1s. per lb. Allied to this is another substitute for India-rubber, "Campticon," an invention of Mr. Frederick Walton. This remarkable substance is formed by the oxidization of linseed oil. Plates of glass are dipped into linseed oil, and allowed to dry. The plates are again dipped and dried, until a sufficient film has accumulated, and then it is removed. In describing his invention, Mr. Walton says: "I soon found that by crushing the solid oxidized oil obtained in sheets, as described in my patent, and working it thoroughly in hot mixing rolls, I produced a substance which required only the cohesive nature which exists so strongly in India-rubber. The addition of a small proportion of shellac soon gave that which was wanting; and I found in my power a

material singularly like caoutchouc when worked into dough, and which could be rolled on to fabrics in the same manner, and with the same facility. Pigments could easily be added to give color, and the addition of the resins gave other or rather varied proportions of adhesion, useful in affording the means of uniting fabrics as by rubber. Fibre, whether flock or cork, mixed in and rolled into sheets, gave me samples of kamptulicon and other floor-cloths." Not only has this singular product been thus assimilated to rubber for uses on fabrics, or combined with fibre for floor-cloths, but, still more strange, it is capable of being worked with pigment, and vulcanized exactly as India-rubber has been described to be, and forms a hard compound like vulcanite and ebonite, excepting that the sulphur is not necessary. It will readily be seen how valuable a substance is here represented; for while it possesses in so great a degree all the qualities of India-rubber, it may be produced at a much less cost. The specimens which Mr. Walton has sent for exhibition show the material in its different stages of manufacture, from the films that are removed from the glass to the masses ready for manufacture into any of the articles above enumerated.—*Sheffield Indep.*

"[Some three or four years ago, Dr. R. F. H. Havemann, of New-Brunswick, N. J., secured patents in this country and in Europe for an imitation of ivory, produced by the action of chlorine on India-rubber or allied gums. By his process solid lumps of India-rubber or gutta-percha are dissolved in one of the well-known solvents used for the purpose; and this solution is brought into contact with chlorine by passing streams of gaseous chlorine into the same. When the combination of the gum with the chlorine is perfected, the solvent is removed by evaporation at a low temperature. After removing the liquid by filtering or evaporation, the composition of gum and chlorine is well washed with alcohol and then pressed and dried, when it forms a white, hard mass, similar to ivory in appearance and elasticity. We have seen billiard balls made of it, but we think they lacked the weight necessary to render them equal to ivory; for many purposes, however, it is an excellent substitute for ivory.—*Amer. Drug. Cir. from Sci. Amer.*

ON CINCHONIA AS A SUBSTITUTE FOR QUINIA.

In the 'Pharmaceutical Journal' for February last, I observe an interesting paper by Mr. Joseph Ince, recommending the salts of cinchonine in lieu of those of quinine; now so far as my experience extends with reference to the employment of cinchonine in the treatment of febrile and other miasmatic diseases of Western Africa, it has proved a decided failure, owing to the headache which has uniformly attended its administration. When I was in medical charge of the troops in Sierra Leone, a large quantity of cinchonine was furnished to the hospital with the view of testing its remedial properties, and also of ascertaining whether it would not answer as an economical substitute for quinine. It was therefore given to both European and negro patients who were suffering under the milder forms of remittent and intermittent fevers and free from any local congestions, in the ordinary doses in which the sulphate of quinine was used. The results of the trial were, however, of such an unsatisfactory character, from the pain and cerebral congestion induced, that the medicine had to be discontinued. It was subsequently combined with calomel and morphia, but without any sensible diminution of the cerebral disturbance. When conjoined with the latter, delirium sometimes set in, which was only relieved by the application of blisters to the neck. With these drawbacks, therefore, cinchonine can never be resorted to as an efficient substitute for quinine in the treatment of tropical diseases.—*Extract from a letter to Professor Bentley, from Dr. W. F. Daniell, Kingston, Jamaica, March 24th, 1863, in London Pharm. Journ.*

ENGLISH INK-GALLS.

At a meeting of the Exeter Naturalists' Club, held in Exmouth, Dr. D'Urban read a paper on the "English Ink-Galls." Most persons, he said, must have noticed the hard brown galls, about the size of musket balls, so conspicuous in winter on the Oaks about Exeter. They are supposed to have made their first appearance in Devonshire about the year 1847. They were

first noticed by Mr. Parfitt, who sent specimens of the insect causing them to Mr. Westwood, in 1848 or 1849. It has only lately, however, been determined to be *Cynips Kollari* of Hartig, a species well known in Germany. About three years ago it suddenly appeared in the woods to the north of London in vast numbers. It is closely allied to *Cynip gallæ-tinctoriæ*, producing the ink-gall of commerce on *Quercus infectoria* in the Levant. The galls of the Devonshire species contain a considerable amount of tannin,* making excellent ink, and yielding a good and permanent dye. Like all other insects which multiply rapidly, it is subject to the attacks of a parasite, which contributes to keep its increase within certain limits. This is a beautiful green chalcite, first bred from these galls by Mr. Parfitt, and described by him in the 'Zoologist' for 1856 under the name of *Callimome Devonensis*. Mr. D'Urban did not think that the galls occasioned much injury to large oaks, but to young trees they are very injurious, frequently distorting the leading shoot, and seriously retarding its growth. They make their appearance on the oaks in this neighborhood early in July, and growing rapidly, reach their full size in August. They are formed on the young shoots of the year, always in the centre of a bud, and are monotholasmous, that is, they contain a single individual only. Some of them produce the flies in September, nearly all being females. The males are remarkably scarce, and have but rarely been obtained. Some remain in the larva state within the gall all through the winter, and emerge in the spring. Few, however, of those hibernating escape the differant species of tit, those little birds picking the hard galls to pieces to get at the fat white grub inside. The galls themselves are very persistent, remaining several years on the trees. Those from which the fly has escaped may readily be known by the presence of a single round hole on one side. Mr. D'Urban then explained the manner in which galls are formed, and the mechanism of the instrument with which the gall-fly makes a puncture in the bark of the trunk or shoots, in the young bud, on the leaf, or

* This result of Mr. D'Urban does not accord with the experiments of Dr. Vinenn (Linn. Soc. Proceedings, vol. 1st, Zoology, p. 72) and of Mr. Braithwaite (Pharm. Journ. vol. xv. p. 544), both of whom found but a very small amount of tannin in these English galls.—ED. PH. JOURN.

on the peduncles of the flowers, according to the part of the tree selected by a particular species, of which a great many infest the oak.—*London Pharm. Journ., from Gardener's Chronicle.*

ARSENITE OF CAFFEINE AND TANNO-ARSENIC ACID USED AS ANTIPERIODICS.

M. Gastinel, Professor at the School of Medicine at Cairo, has presented to the Egyptian Institute two new arsenical compounds—viz., arseniate of caffeine and tanno-arsenic acid, both perfectly crystallized, and having a well-defined chemical constitution. M. Schnepf, sanitary physician at Alexandria, has lately studied the therapeutical action of these two compounds, and the following are some of the cases which he has recorded. The first case was that of a man forty-five years old, who had just had two paroxysms of fever. A cathartic and emetic were first given, and produced vomiting and purging; then on the next morning he took twenty centigrammes of tanno-arsenic acid in some water, in doses of one centigramme every quarter of an hour. This was on the day when the paroxysm was expected to return, but it was almost entirely absent, the patient complaining, however, of a little frontal headache. The dose was repeated on the two following days, and there was no return of the fever, and after a short time the patient entirely recovered. In another case the patient was a man about forty years old, attacked with a tertian fever. On the day when the fever was absent he took twenty centigrammes of tanno-arsenic acid. The paroxysm did not return on the following day, and the arsenical compound was continued for two days longer. The patient complained of loss of appetite for a few days, but soon recovered entirely. The third case was that of a man of fifty years old, suffering from a quotidian fever. The first attack surprised him suddenly in a violent manner, and was attended with great prostration. The next day an emetic was administered, but the paroxysm returned. After the remission, on the third day, twenty centigrammes of the tanno-arsenic acid were

given, and the paroxysm did not return, although some headache remained, with wandering pains in the stomach. Twenty centigrammes more were given, and the fever never reappeared, but there remained a strong dislike for food, and a painful sensation at the epigastrium. Gradually, however, the appetite returned, and the man became quite well.—*Brit. and For. Med.-Chirurg. Rev.*, Jan. 1863, from *Gazette des Hopitaux*, Jan. 1862.

DR. JOULE'S NEW SENSITIVE THERMOMETER.

At the last meeting of the Manchester Philosophical Society, Dr. Joule described a new thermometer of such exquisite sensibility as to be capable of being affected by the heat radiated from the moon. It consists of a glass tube, closed at both ends, two feet in length by four inches in diameter, divided longitudinally by a blackened pasteboard diaphragm, extending to within an inch of the two ends. In the upper space so left, a piece of magnetized sewing needle, furnished with an index, is suspended by a single filament of silk.

It is evident that the slightest increase of temperature on one side will occasion an expansion of the air on that side, which will consequently ascend, and, after passing across and affecting the index, will descend on the other side. So exquisitely delicate is this instrument, that it indicates the heat given out by a pint of warm water at a distance of three yards, and it is also able to detect the heat radiated by the moon; for as a beam of moonlight admitted through an aperture in a shutter was allowed to pass across the instrument, the needle was deflected several degrees, first to one side and then to the other. This instrument, at once so simple and so delicate, promises to be of extreme use in many thermometrical and meteorological experiments, and, in general, in all sciences where the observation of slight difference of temperature is of importance.—*Chem. and Drug.*, London, April 15, 1863.

NOTES ON THE EXTRACTION AND ESTIMATION OF SOME OF THE CRYSTALLINE PRINCIPLES OF OPIUM.

BY R. HAINES, M. B.

Professor of Materia Medica, Grant College, Bombay.

(Concluded from page 273.)

Estimation of Morphia.—On this subject an interesting paper was read by Dr. Giraud, in December, 1850, in which the advantages of O'Shaughnessy's process, as giving at one and the same operation the proportion both of morphia and of narcotine, were pointed out. I can, upon the whole, fully join in the praises bestowed upon this method; but, at the same time, I have found that, in the form practised by the author of that paper, it did not quite meet all requirements, especially in regard to the purity of the bases obtained by it. I have been, therefore, induced to make some little modifications, which, I think, leave it in a state as nearly perfect as possible. It will be recollected that the principles upon which it proceeds are: 1st, the solubility of narcotine in a sufficient quantity of cold rectified spirit; and 2d, the strong basic property of morphia, whereby it is capable of decomposing a salt of ammonia when boiled with it, setting the ammonia free, and combining with its acid. The method of proceeding which I have found most advantageous is the following (the quantity of opium to be used is immaterial; if sufficient is at hand, 1000 grains, as recommended by O'Shaughnessy, is a convenient quantity): The opium is broken up into pieces as small as possible, and digested in five times its weight of rectified spirit in a stoppered bottle, with occasional agitation, for a couple of days. The tincture is strained through calico and pressed, and the marc transferred to a flask, which is to be closed with a stopper or glass plate. The calico is washed with half as much spirit as that first used, which is then digested with the opium for twenty-four hours more, after which the flask is placed in a water bath, the cork having been removed, until the spirit begins to boil. It is then removed from the bath, and when cool the liquid is strained through calico and thoroughly pressed out, being washed at last with a few drachms of spirit. In this way a complete exhaustion is effected, any remnants of narcotine being brought into solution at the boiling temperature. The liquid, if turbid, is

filtered through paper, poured into a retort placed in a water bath, and solution of ammonia, in quantity sufficient to destroy completely the acid reaction, is added. Two drachms will be ample for this purpose; the use of so much as one ounce, formerly recommended, is quite unnecessary. If the spirit is very strong, a few drachms of water may be added, and the distillation proceeded with. When four-fifths of the spirit have been distilled off, the retort is removed,* its contents poured into a porcelain capsule, and the retort washed with a small quantity of rectified spirit, which is added to the rest. The capsule is covered and left for twenty-four hours. During the distillation most of the alcohol is driven over, and a weak spirit, much under proof strength remains, in which, when cold, narcotine is scarcely at all soluble. The mass is squeezed through linen, which is better than calico in this case, the crystals of narcotine washed several times with a little rectified spirit, and again pressed.

The liquors are united and mixed with water equal to four times the weight of the opium employed. After twenty-four hours the clear liquid is strained off from the deposited resin, gently evaporated to one-fourth of its bulk, the remainder brought nearly to boiling, and mixed in a beaked tumbler with half its bulk of rectified spirit. Solution of ammonia is then added, until, after blowing away the air in the vessel, the smell of ammonia remains permanently perceptible, or until the air retains an alkaline reaction. In a few minutes flaky crystals of morphia make their appearance, and rapidly increase as the liquid cools. They adhere but little, and sometimes not at all, to the walls of the vessel. It is well, at the expiration of twelve hours, to stir the liquid smartly, which expedites the complete precipitation of the morphia. After twenty-four hours the crystals are filtered off, washed and dried. If they should be very much colored, which is not often the case, they may be dissolved by warming

* It is essential that all the ammonia be driven off, otherwise, on the subsequent dilution of the liquid with water, some of the morphia will be precipitated with the resin and lost. The last portions of spirit should, therefore, be tested, and, if found alkaline, an additional quantity of pure spirit should be poured into the retort, and the distillation renewed until no more ammonia appears in the distillate.

with a little caustic soda or potash, the liquid diluted, filtered, heated, mixed with alcohol, slightly supersaturated with acid, and precipitated as before by ammonia.

The crystals of narcotine are treated with cold caustic soda or potash of the usual strength. This dissolves the adhering resin, but leaves the narcotine unaffected. After some hours, if the crystals are not quite colorless, the liquid may be heated to 180° for a short time, poured off from the crystals, and the operation repeated with fresh solution of soda. The liquid is then diluted with much water, and the narcotine allowed thoroughly to subside. The clear liquid is then poured off, water added, and the narcotine collected upon a paper filter, washed and dried. The strong alkaline liquid clogs the paper too much to render immediate filtration practicable; hence the necessity of separating it, in the first place, by the subsidence of narcotine. The crystals are thus obtained at once and without the trouble and loss of re-crystallization, snow-white, notwithstanding the dark color of the liquid in which they are formed, for the coloring matter is merely superficially adherent; they are also perfectly pure, every trace of morphia being removed by the alkali. The decolorization of morphia is much more difficult, the coloring matter being incorporated with the substance of the crystals. It can only be removed entirely by the use of animal charcoal.

The process, it will be observed, differs from that employed by Sir W. O'Shaughnessy and by Dr. Giraud in the following points:—The extraction of the opium is effected in two macerations instead of one, the last time at a boiling temperature. The quantity of ammonia used is only a third or a fourth of that originally employed. The narcotine is washed with spirit instead of water, the immediate effect of the latter being to throw down quantities of resin upon the crystals in an insoluble form. The narcotine is not dissolved in acid, and re-precipitated by ammonia, which, in reality, does very little towards purifying it. I have repeatedly obtained the narcotine by O'Shaughnessy's process as an almost black resinous mass, adherent to the paper, and totally devoid of crystallization. It is evident, therefore, that the results are not fully to be depended on. By the present method the trouble is less, and the result, as may be seen by the specimens on the table, very satisfactory. As to the morphia, the syrupy liquid which contains it is diluted with less

water, but I find that the quantity I have mentioned is more than sufficient. Instead of adding the ammonia at once to the cold clear liquid, by which a highly impure and resinous morphia is thrown down, the solution is concentrated, mixed with alcohol, and precipitated hot with ammonia. The spirit keeps the resin in solution, and, aided by the effect of heat, retards the separation of the morphia, so that it has time to form distinct crystals. This has been previously pointed out by M. Fordos. The loss of morphia by solution in the spirit is perfectly inappreciable, and is more than compensated by the reduction in the bulk of the liquid by previous evaporation. It is, I believe, an essential step in all precipitations of morphia.

All the processes hitherto recommended had in view merely the estimation of morphia. In addition to the method of Couerbe,† commonly known as Mohr's, and the manufacturing process of Gregory,‡ adopted, but not advantageously, as an analytical one by Berthemot,§ may be mentioned that of Guillermond,|| who precipitates a spirituous solution at once and without concentration by ammonia, and separates the morphia and narcotine mechanically; or the modification of Riegel,¶ who separates the narcotine from the morphia by treatment with ether; the original one of Robiquet,** who precipitates the aqueous solution by boiling with magnesia, dissolves the precipitate in boiling alcohol, and treats the crystals which form on cooling with ether to dissolve narcotine; that of Thiboméry,†† who precipitates hot with ammonia; that of Fordos,‡‡ who mixes an aqueous infusion, without previous evaporation, with spirit, and precipitates cold with ammonia, separating the narcotine by washing with ether and chloroform; lastly, that of Merck,§§ a most trustworthy and practical experimenter, who evaporates the watery infusion to a small bulk, adds an excess

† Pereira's "Materia Medica," 3rd ed., vol. ii., p. 2107.

‡ Geiger und Liebig's "Handbuch der Pharmacie," band i., s. 1191.

§ Pereira's "Mat. Med.," *loco cit.*

|| Journal de Pharmacie, 3me sie., tome xvi., p. 17; Pharmaceutical Journal, vol. ix., p. 236; Liebig and Kopp's "Annual Report for 1849," English edition, p. 422.

¶ Pharm. Journ., vol. xi., p. 418.

** Ann. Ph. Phys., 2me. sie., tome v. p. 279.

†† Pereira's "Mat. Med.," *loco cit.*

‡‡ Comptes Rendus, vol. xxiv., June 15, 1857; Pharm. Journ., vol. xvii., p. 289.

§§ Geiger und Liebig's "Handbuch der Pharmacie," band i., s. 1188.

of carbonate of soda, continues the evaporation to dryness, washes with water, then with spirit, and treats the residue with very weak acetic acid as long as it is neutralised, which dissolves morphia only and not narcotine, filters through pure animal charcoal, and precipitates with ammonia.

But, whatever method is adopted, hurry is to be avoided. The thorough extraction of the opium requires time, and too much time, also, can hardly be allowed for the crystallization of the morphia. Filtrations, too, are tedious operations if effectually performed. The use of spirit as the extracting agent is, on the small scale, much preferable to that of water for all purposes of analysis. It brings into solution all the crystalline principles, including the narcotine, and, by leaving undissolved much of the gummy matters, it renders the crystallization and purification more easy and complete. By the process above described, I have repeatedly obtained crystals of morphia half an inch and upwards in length, even when operating upon as little as 300 grains of opium. The morphia is separated by this method with fully as much ease and accuracy as by any other, and certainly by no other means can the entire quantity of narcotine be so readily extracted—a matter of some interest now that the antiperiodic properties of this base are so fully established.

Subjoined are the results obtained by the application of this process to some little-known varieties of opium :—

No.	Name of Source.	Per Cent.				Remarks.	
		Moisture, dried at 220°.	Smokable extract.	Narco- tine.	Mor- phia.		
Persian ;							
1	Shiraz.....	(about) 5.0	62	5.74	5.69	In muller-shaped cakes. Ditto.	
2	Sheereh (from Ispahan)...	(do.) 6.0	80	6.00	7.67		
3	Pooreh (ditto).....	(do.) 7.0	84	4.56	4.46		
4	Kerman.....	5.46	65	6.58	10.33		
5	Kazeroon (from Shiraz) ...	7.33	78	6.13	6.89	In thin sticks wrapped in colored paper. Thick consistence, mouldy.	
6	Istehbanut (ditto).....	8.00	73	4.58	6.58		
7	Yezd (in sticks).....	5.30	82	5.89	9.46		
8	Ditto, in lump.....	10.81	50	5.76	5.18		
Indian:—							
9	Benares, 1850.....	6.33	46	5.32	3.34		
10	Patna, 1850.....	3.33	53	4.90	4.53		
11	Malwa, 1850.....	6.00	58	4.08	5.00		
12	Punjab, No. 1.....	8.73		3.17	4.44		
13	Ditto, No. 2.....	8.67		2.73	9.26	Consistence of treacle.	
Chinese:—							
14	Opium from Canton.....	(about) 7.0		7.15	4.63		
15	Smokable Extract, first quality, from Canton. (Qy. Indian opium,.....	19.09	{ Nearly all soluble in water. }	1.30	11.57		

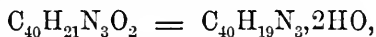
—*Lond. Chem. News, Feb. 7, 21, 28, 1863.*

ON THE CHEMICAL COMPOSITION OF MAGENTA.

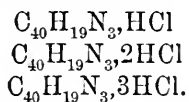
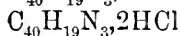
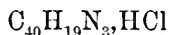
Several different chemists have undertaken the examination of the new coloring matter derived from aniline, and known as Fuchshine or Magenta, with the view of ascertaining its chemical composition and constitution. The results hitherto obtained, however, have been so discordant as to lead to nothing satisfactory. The principal obstacle to success which encountered these experimenters appears to have been the difficulty of procuring the coloring matter in a state of absolute purity, and the readiness with which its properties are masked by the presence of the smallest quantity of foreign matter. Mr. E. C. Nicholson, of the firm of Messrs. Simpson, Maule, and Nicholson, the principal manufacturers of Magenta in this country, has, however, devoted himself to the production of this substance in the pure state, and, from the ample resources at his command, has succeeded in preparing a complete series of perfectly definite compounds in beautiful crystals. The first difficulty being thus overcome, the products were placed at the disposal of Dr. Hofmann, and the results of this distinguished chemist's investigation are now published.

The color magenta, then, consists of a salt, usually the acetate, of a new base or alkaloid, for which Mr. Nicholson proposes the name of *Roseine*, but Dr. Hofmann wishing to preserve a remembrance of its origin, christens *Rosaniline*. It is a remarkable property of this substance, that, while all its compounds possess the magnificent characteristic color of magenta, it is itself colorless. The pure base may be prepared from the acetate, which is the compound generally used in dyeing, by decomposing a boiling solution of the salt with a large excess of ammonia. A crystalline precipitate of a reddish color is thrown down, which consists of the base in a state of great purity. The colorless liquid filtered from the precipitate yields, on cooling, a crop of *perfectly white*, needle-shaped or tabular crystals; these consist of absolutely pure rosaniline. Unfortunately, the extent of solubility of this substance in ammonia, or even in boiling water, is very slight, so that only a very small quantity of the base can be obtained in this absolutely colorless condition. Rosaniline is a little more soluble in spirit; the solution pos-

sesses a deep red color. It is insoluble in ether. Exposed to the air the base becomes rapidly rose colored, and ultimately deep red. During this change of color no variation of weight can be perceived. At 100° C. rosaniline loses a little adherent water, and may then be heated to 130° C. without change; at a higher temperature it decomposes, giving off an oily liquid, principally aniline, and leaving a carbonaceous residue. The analysis of rosaniline led to the formula:—*



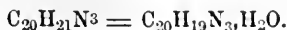
which was confirmed by the examination of its salts and characteristic combinations. Rosaniline constitutes a powerful well-defined base, forming several series of salts, all remarkably crystalline. Dr. Hofmann regards it as a triacid triamine, which is capable of producing three classes of salts.—



At present, however, he has only succeeded in producing the first and last salt, and the great tendency of the base appears to be to form monacid compounds. The salts, with one equivalent of acid, are extremely stable; they may be crystallized four or five times, without in the slightest degree changing. The salts, with three equivalents of acid, have only a slight stability, and are decomposed by the action of water, or a temperature of 100° C. From the formula of the hydrochlorates, it is evident that the white crystals of the base really constitute a hydrate, the salts not containing oxygen.

The mono-salts of rosaniline may be obtained in two ways, either by direct combination with the several acids, or by boiling the pure base with an ammonia salt of the acid. The two methods furnish equally pure salts. The salts with one equivalent of acid, for the most part present by reflected light the green lustre of cantharides' wings. Viewed by transmitted light, the crystals are red, and in large mass almost opaque. The aqueous or alcoholic solutions of these salts possess the magnificent crimson color so well known.

* Dr. Hofmann, using the new equivalents $\text{C} = 12$ and $\text{O} = 16$, writes the formula—

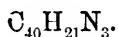


The tri-acid salts, on the contrary, are of a yellowish brown, both in the solid state or in solution, and they are much more soluble in water and alcohol than the mono-acid salts, which are comparatively but slightly soluble.

The mono-hydrochlorate of rosaniline may be prepared either by combining the base with hydrochloric acid, or by boiling it with sal-ammoniac. It deposits from its boiling solution in well-defined rhombic tables, often united into the form of a star. It is difficultly soluble in water, more soluble in alcohol, and insoluble in ether. It is very hygroscopic. This compound is more soluble in moderately diluted hydrochloric acid than it is in water. If the slightly warm solution is mixed with very strong hydrochloric acid, it solidifies on cooling to a mass of magnificent needle-shaped crystals of a reddish-brown color, which must be washed with concentrated hydrochloric acid, and dried over oil of vitriol and lime. These crystals constitute the terhydrochlorate, $C_{40}H_{10}N_3 \cdot 3HCl$. Water decomposes this salt. Heated to 100° it gradually loses its acid; the brown crystals become first of an indigo-blue color, and if heated long enough, pass to the original green mono-salt. The sulphate of rosaniline is easily obtained by dissolving the base in dilute boiling sulphuric acid. It forms green crystals like the chloride. The acetate is perhaps the most beautiful of the series. Mr. Nicholson has obtained it in crystals a quarter of an inch thick. It is the most soluble in water and alcohol.

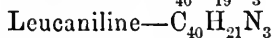
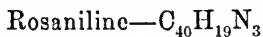
Action of Reducing Agents on Rosaniline.—From rosaniline Dr. Hofmann has succeeded in obtaining another basic substance of a very definite nature, to which he gives the name *Leucaniline*. It is obtained by the action of reducing agents, either nascent hydrogen or sulphuretted hydrogen, upon a salt of rosaniline—the readiest method for its production being to digest commercial fuchsine or magenta, with sulphide of ammonium, for some time. A fused mass results, which solidifies on cooling to a brittle scarcely crystalline body, which consists of leucaniline. The mass is powdered, washed with water, and dissolved in dilute hydrochloric acid, to separate the sulphur and impurities. Concentrated hydrochloric acid is added to the deep brown solution so obtained, when a crystalline precipitate is thrown down, which is washed with strong acid, and may be

farther purified by again dissolving in dilute acid, heating the solution to the boiling point, and then adding strong acid; the liquid remains clear; and as it cools, the chloride of leucaniline separates in crystals. These are rectangular tables, well formed, but very small, and of a dazzling white color. They may be recrystallized from water, or dissolved in alcohol, and precipitated by the addition of ether, in which they are perfectly insoluble. The pure chloride furnishes, on the addition of ammonia, leucaniline as a perfectly white powder, which assumes a rose color by exposure to the atmosphere of the laboratory. It is scarcely soluble in water, very soluble in alcohol and scarcely so in ether. It cannot be obtained in fine crystals from these solvents. When heated it becomes red, and at 100° C. fuses to a red transparent liquid. It is anhydrous, its formula being—



Its chloride is tri-acid, and when dried *in vacuo* retains one atom of water. Its formula is $\text{C}_{40}\text{H}_{21}\text{N}_3, 3\text{HCl}+2\text{HO}$. It furnishes a beautiful and very crystalline platinum salt having the composition $\text{C}_{40}\text{H}_{21}\text{N}_3, 3\text{HCl}, \text{PtCl}_2+2\text{HO}$.

The salts of leucaniline are in general well crystallized; they are all very soluble in water, and are precipitated from their aqueous solutions upon the addition of their respective acids. The sulphate is remarkable for the facility with which it crystallizes. It will be seen, by comparing the formula of leucaniline with that of rosaniline, that it only differs from the latter by containing two atoms more of hydrogen.



Dr. Hofmann therefore compares these two bases to blue and white indigo, which, as is known, only differ from each other by two atoms of hydrogen.

Leucaniline is easily changed back again into rosaniline by oxidizing agents. The reaction succeeds perfectly with peroxide of barium, perchloride of iron, or chromate of potash. On carefully heating the colorless solution of the chloride with one of these agents, the fluid rapidly assumes the beautiful crimson color of the salts of aniline.—*Lond. Pharm. Journ., May, 1862.*

CHEMISTRY OF COMMERCIAL ANILINE.*

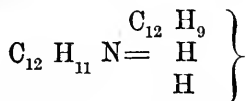
Dr. Hofmann has been engaged in investigating into the nature of the less volatile liquids which are produced during the manufacture of aniline upon the large scale. These liquids commence to boil at 182° C., and the temperature continues to rise, without indicating any fixed point, until the limit of the mercurial range is reached, and it is necessary to remove the thermometer from the retort. Collecting separately that which distils between 200° and 220° , and that which passes over between 270° and 300° , basic oils are obtained, consisting chiefly of toluidine and toluylene-diamine. Separating that which distils above 330° , a thick brown liquid is obtained, which, treated with dilute sulphuric acid, furnishes a crystalline mass, containing two salts,—the one soluble, the other remarkable for its insolubility. The *soluble* sulphate, when separated and decomposed by caustic soda gives a viscid basic oil, which becomes solid in the course of a few days. This, purified by compression between bibulous paper and crystallization from water and from alcohol, furnishes long white silken needles, which are little soluble in water, very soluble in alcohol and ether, fuse at 192° , and distil, without decomposition, at a temperature beyond the range of a mercurial thermometer. This body possesses precisely the same composition as aniline, and is therefore named by Dr. Hofmann *Paraniline*. It forms definite, well crystallized salts, the study of which has indicated that this base should be represented by the formula $C_{12} H_{14} N_2$, that is to say, double that of aniline.

Paraniline is capable of fixing either one or two equivalents of acid. The mono-acid compounds are obtained with great facility; they possess a fine yellow color. Dr. Hofmann describes the sulphate, the nitrate, the hydrochlorate, and the platinum salt.

The *insoluble* sulphate obtained at the same time as the soluble sulphate, by treating the bases distilling above 330° with dilute sulphuric acid, may be purified by boiling with alcohol, in which it is insoluble, and dissolving in very large quantities of

*Dr. Hofmann uses the new equivalents, in which $C=12$ and $O=16$, and in this and the following article his formulæ have been retained unaltered.

boiling water, filtering, and crystallizing. To isolate the base, this sulphate is suspended in weak alcohol, and submitted to the action of caustic soda, when a solution is obtained which deposits on the addition of water the new base, in the form of white scales, little soluble in boiling water, very soluble in alcohol and ether, fusing at 45° , and boiling at 322° without alteration. This base has the composition $C_{12}H_{11}N$, and constitutes a primary monamine—



The author proposes for this base the same *Xenilamine* (from *ξένος*, stranger), on account of the obscurity of its origin.—*London Pharm. Journ.*

THE CHEMISTRY OF ANILINE COLORS.

It will be remembered that some time back* Dr. Hofmann made a most interesting investigation into the nature and composition of magenta, and succeeded, through the instrumentality of Mr. E. Nicholson's manufacturing skill, in demonstrating that this magnificent dye really consists of a salt of a new base to which he applied the name of *Rosaniline*. From rosaniline he at the same time obtained another and homologous base, which was christened *Leucaniline*. Mr. Nicholson has since placed in the hands of this distinguished investigator a yellow coloring-matter, which is obtained as a secondary product in the manufacture of rosaniline. This body communicates a golden-yellow tint to silk and wool; it occurs in the form of a yellow amorphous powder, resembling chromate of lead; it is difficultly soluble in water, but very soluble in alcohol and ether. This substance constitutes another well-defined base, giving two series of readily crystallizable salts. Dr. Hofmann proposes to designate this base *Chrysaniline*. Its most characteristic compound is the proto-nitrate, which is sparingly soluble in water; treated by ammonia it furnishes pure chrysaniline, which when dried at $100^{\circ}C.$, has the formula $C_{20}H_{17}N_3$.

* See page 342 of this number.

Hydrochlorate, $C_{20}H_{17}N_3 \cdot 2HCl$.—This salt occurs as a scarlet crystalline precipitate, formed of scales, which are very soluble in water, less soluble in alcohol, almost insoluble in ether. When maintained during fifteen days between 160° and 180° C., it is changed into a yellow powder, which constitutes the mono-acid hydrochlorate $C_{20}H_{17}N_3 \cdot HCl$.

Nitrates.—These are magnificent salts, crystallizing easily in needles of a ruby-red color, and remarkably insoluble in water. A dilute solution of nitre (containing 1 gramme of nitric acid to a litre of water), when mixed with a moderately concentrated solution of a salt of chrysaniline, gives a crystalline precipitate so readily, that this base may serve as a reagent for the detection of nitric acid. The two nitrates have the formulæ respectively of $C_{20}H_{17}N_3 \cdot HNO_3$ and $C_{20}H_{17}N_3 \cdot (HNO_3)_2$. It is difficult to obtain the one of these free from small quantities of the other.

Sulphate.—Very soluble; crystallizes with difficulty.

Platinum salt.—Crystalline scarlet precipitate, which is deposited in very fine large tables, containing a mixture of the mono-chloroplatinic and the dichloroplatinic salts, fixing more or less water of crystallization.

The composition of chrysaniline establishes a direct relation between this substance and rosaniline and leucaniline :—

Chrysaniline . . .	$C_{20}H_{17}N_3$.
Rosaniline . . .	$C_{20}H_{19}N_3$.
Leucaniline . . .	$C_{20}H_{21}N_3$.

The first is mono-acid or diacid; the second is mono-acid or triacid, but it possesses a very decided tendency to function as mono-acid; the third forms exclusively triacid compounds.—

London Pharm. Journ., May, 1863.

THALLIUM IN FURNACE PRODUCTS.

By W. T. ROEPPER.

(Communicated in a letter to Prof. Geo. J. Brush.)

In examining before the spectroscope some of the dust deposited by the tunnel-head flame on the boilers of the Bethlehem Iron Works, a sharp, bright green line flashed up midway be-

tween the green calcium and Ba α line, which, judging from Crookes' description, appeared to be the thallium line, a conjecture which Prof. Brush verified by comparison with some of Lamy's chloride of thallium. The line appeared at 90° on the scale of the instrument, sodium being at 60° and the red and violet potassium lines respectively at 7° , and 226° . In addition to the above lines, the spectra of sodium, potassium, lithium and calcium are distinctly displayed by this dust. Thallium and the alkalis seem to exist in the dust, at least in part, as sulphates, which can be extracted by water. Similar dust from one of the other furnaces along the Lehigh gave the same results; hence it is not unlikely that thallium is a common product of the anthracite furnaces, and is perhaps derived from the pyrites accompanying the coal, though Crookes found the non-cupriferous pyrites to be almost free from this element.*

It is only the dust which remains lying on the boilers, or is deposited on the iron doors or shutters of the boiler-chamber, which gives the thallium reaction, while that which has fallen to the floor does not show it. The reason probably is, that it is volatilized by the higher heat of the flame, and escapes through the chimney as soon as it is removed from the comparatively lower temperature of the steam and the outer doors, which seem to act as condensers. I have not been able to detect it in the ashes of anthracite from a common stove, while they beautifully display the sodium, potassium and lithium lines.—*Amer. Jour. of Science and Arts*, May, 1863.

Bethlehem, Pa., April 8, 1863.

VEGETABLE PRODUCTIONS OF THE FEEJEE ISLANDS.

A "Blue Book," entitled "*Correspondence relative to the Fiji Islands*," May, 1862, gives a full and official account of the arrangement between the British Consul, Mr. Pritchard, and *Ebenezer Thakombau*, claiming to be king of the Fiji Islands, for the cession of the latter to the British crown, and of the appointment of Col. Smythe as a commission to visit these islands

* Mr. Crookes has recently announced that he has found thallium in comparatively large quantities in the deposit from the flues of Mr. Spence's pyrites burners at Manchester.—*Chem. News*, vii, 150.—G. J. S.

and to report whether the acquisition would be desirable,—whereupon the commissioner visited the islands, accompanied by Dr. B. Seemann, who was instructed to explore and report upon their vegetable productions and resources. Col. Smythe very sensibly reported that Thakombau, although perhaps the most influential of the independent chiefs, had no claim to the title of king of Fiji, and that it was inexpedient to accept his offer. What most interests us is the appendix, containing Dr. Seemann's elaborate Report on the Vegetable Productions and Resources of the Vitian or Fijian Islands. This treats, 1, of the climate, soil, and flora in general of these islands; and, 2, of the Colonial Produce, so-called, such as sugar, coffee, tamarinds and tobacco, which they may be expected to yield, as also certain oils and fats, farinas, and spices. 3. The staple food of the people. This "is the same all over Polynesia, being derived, with the total exclusion of all grain and pulse, from the yam, the taro, the banana, the plantain, the bread fruit, and the cocoa-nut; but the bulk of it is furnished in the different countries by only one of these plants. In the Hawain group the taro takes the lead, whilst the cocoa-nut is looked upon as a delicacy, from which the women were formerly altogether cut off. In some of the smaller coral islands the inhabitants live almost entirely upon cocoa-nuts. The Samoans place the bread-fruit at the head of the list. Again, the Fijians think more of the yam than of the others, though all grow in their islands in the greatest perfection, and in an endless number of varieties." Of edible fruits there is a long list, the bread-fruit and bananas being the most important, and the account of the *Ivi*, (*Inocarpus edulis*), is the most interesting, now that its botanical relationship has been detected by Mr. Benthams. 4. *Cannibal vegetables*, the vegetables eaten with human flesh,—formerly an important part of Fijian dietetics, and not yet entirely obsolete,—form the subject of a separate section. Human flesh, it appears, is extremely difficult to digest, and, perhaps on this account, was eaten with the leaves of three vegetables which were thought to assist the process, viz: of *Trophis anthropophagorum* and *Solanum anthropophagorum* of Seemann, and of *Omalanthus pedicellatus*, Benth., an Euphorbiaceous plant. 5. *National Beverages*. Like the other Polynesians, they prepare an in-

toxicating drink from the root of *Piper methysticum*. "In order to prepare the beverage, it is necessary to reduce the roots to minute particles, which, according to regular Polynesian usage, is done by chewing,—a task, in Fiji, devolving upon lads who have sound teeth, and who occupy a certain social rank towards the man for whom they perform the office. . . . Some Fijians make it a point to chew as great a quantity as possible in one mouthful; and there is a man of this sort at Veratra, famous all over the group, who is able within three hours' time to chew a single mouthful sufficient to intoxicate fifty persons." Although the Fijians drink the natural liquor of young coconuts, they were not acquainted, nor were any Polynesians acquainted, with the art of extracting and fermenting toddy from the cocoa-nut palm. From which it is inferred, that, if the Polynesians are of Malayan origin, they must have left the cradle of their race before the extraction of toddy from the cocoa-nut tree, or even the tree itself, was known there. Indeed, this palm itself is thought to have made its way by the drifting of its fruits across the Pacific from east to west, through the Polynesian Islands, and to have reached Ceylon within what may be called historical times.

6. *Vegetable Poisons*. Under this head is an interesting account of the kau-karo (literally Itch-wood), the *Oncocarpus Vitiensis*, A. Gray, which acts like the Poison Rhus of North America and of Japan, only with tenfold virulence. Indeed, a drop of the juice, falling upon the hand of one of Dr. Seemann's companions, "instantly produced a pain equal to that produced by contact with a red-hot poker." The *Excoecaria agallocha*, known through the East, is equally virulent with its ally the Manchineel tree. The smoke of the burning wood is used by the Fijians to cure leprosy,—a terribly severe, but sometimes an effectual, remedy.

7. *Medicinal Plants*. None of real importance are brought to light.

8. *Scents and Perfumes*. These are used for scenting the coconut oil which the natives profusely apply to the hair and to the naked body. Besides that obtained from several flowers, from the fruit of *Parinarium laurinum* and of *Eugenia* (*Jambosa*) *neurocalyx*, A. Gray, and from the bark of a species of *Cinnamomum*, the most famous is that yielded by the Sandal-wood of the islands, which, formerly abundant at Sandalwood Bay, is

now almost annihilated. 9. *Materials for Clothing*. The *tapa*, made of the bark of the Paper Mulberry, mainly furnished what scanty clothing was needed, until the introduction of cheap cotton cloth by traders. Successive sections discourse of *Fibres used for cordage*; of *Cotton*, several sorts of which have been introduced and run wild in these islands, and the better sorts are now cultivated with success; of *Timber*, the most important being a kind of kowrie-pine or *Dammara*, and *Calophyllum inophyllum*. The wood of the latter, abundant by the sea-side, is used for canoes and boats, while its seed yields an important oil, but the most valued wood is that of *Afzelia bijuga*, A. Gr., which is almost indestructible. *Palms*, *Sacred Groves*, *Ornamental Plants*, &c., occupy the remaining sections.

Having submitted his economical report, Dr. Seemann is now turning his attention to the scientific botany of the Feejee Islands, where he made a collection second in extent and interest only to that of the U. S. Exploring Expedition under Commodore Wilkes. The *Flora Vitiensis* which he has announced as in preparation, is to be a royal quarto volume of about 400 pages of letter press, and 100 colored plates by Mr. Fitch,—to be published by Lovell Reeve & Co. In form and extent it will therefore equal his well known Botany of the Voyage of the Herald; and it cannot fail to be interesting and important. —*Amer. Jour. of Science and Arts*, May, 1863.

ON THE QUESTION WHETHER DIATOMS LIVE ON THE SEA-BOTTOM AT GREAT DEPTHS.

BY WM. STIMPSON, M. D.

In a paper on the Diatomaceæ found in mud collected at great depths from the bottom of the sea off the coast of Kamtschatka, in soundings made by the North Pacific Expedition under Com. Rodgers (see *Am. Jour. Sci. & Arts*, [2], xxi, 284), the late lamented Prof. Bailey made the following remark: "The perfect conditions of the organisms in these soundings, and the fact that some of them retain their soft parts, indicate that they were very recently in a living condition, but it does not follow that they were living when collected at such immense depths." My attention has recently been called to this subject by the

perusal of an account of the recent discoveries of animal life in various forms at depths vastly greater than had been previously suspected; for instance, at 1400 fathoms by Torell, at 1000 and 1500 fathoms by Milne-Edwards, and at 3000 fathoms by Dr. Wallich. The question of the nature of the food of these abysmal animals is one of great interest, and I wish to place on record, in advance of the publication of the report of the expedition, the results of my examination of the specimens alluded to by Prof. Bailey, when they were freshly taken from the water.

In the sounding taken at the depth of 2700 fathoms, in lat. $56^{\circ} 46' N.$, long. $168^{\circ} 18' E.$, Lieut. Brook used, for the armature of his lead, three quills, each about three inches in length, fastened together, and placed in such a position that when the lead struck the bottom the quills would be forced perpendicularly into it, and thus become filled with mud from a stratum a few inches below the general surface of the sea-bottom. The experiment was successful; the quills coming up compactly filled with mud of the usual character occurring at such depths in such latitudes. One of the quills having been submitted to me for microscopic examination, was carefully wiped and cut in two at the *middle*, in order to secure for examination a specimen, as nearly as possible free from any chance admixture from the water near the surface. In this specimen I found an abundance of diatoms, some of which, apparently *Coscinodisci*, appeared to me to be undoubtedly living, judging from their fresh appearance and the colors of their internal cell contents.

It is exceedingly doubtful whether sufficient light can penetrate to so great a depth to afford the stimulus which these vegetable organisms are supposed to require for their existence and multiplication. On the other hand, it is by no means certain that some amount of light does not so penetrate, and, if we deny the existence of vegetable life in these abysses, it will be difficult to account for the existence there of animals, which must, ultimately, derive their sustenance from the vegetable kingdom. The supply which they might obtain from the dead bodies of those organisms which die at the surface, and slowly sink through two or three miles of water to the bottom, seems

totally insufficient, for Dr. Wallich has proved that the animals, starfishes for instance, not only exist at those depths, but exist in great numbers. We would call the attention of those who may have an opportunity of obtaining specimens of the bottom at great depths, to the great importance of a microscopic examination of these specimens as soon as taken from the sea. Fresh water should, of course, be used in spreading the mud upon the slide.—*Am. Journ. of Science and Arts*, May, 1863.

ON THE DECOMPOSITION OF CHLORATE OF POTASH AT A LOW TEMPERATURE, IN PRESENCE OF PEROXIDE OF MANGANESE.

By M. E. WIEDERHOLD.

The author set himself to study the catalytic decomposition of chlorate of potash in presence of oxides of manganese and copper. Contrary to M. Schonbein's hypothesis, he found that oxygenated bodies are not the only ones capable of determining this decomposition; for spongy platinum he found induced the same effect.

An intimate mixture of two parts of chlorate of potash and one part of artificial peroxide of manganese begins to disengage oxygen between 200 and 205°; and this phenomenon takes place with the same proportions of chlorate mixed with oxide of copper at 230°; with platinum black, or natural peroxide of manganese at 260 to 270, and with peroxide of lead at 280—285°.

The author believes that the action of these bodies is most likely due to their great power of absorbing heat, and in part also to the relative volume of the catalysing substances.

An interesting fact observed by him is the rising of the temperature of the mixture when the metallic bath wherein the retort is plunged reaches 250° for the mixture of chlorate and peroxide of manganese, and 290 for that of chlorate and oxide of copper.

In none of these decomposition is perchlorate of potash produced.—*Chem. News, Lond.*, April 4, 1863, from *Poggendorff's Annalen der Physik und Chemie*, vol. cxvi., p. 171.

ON THE ESTIMATION OF NITRIC ACID.

BY M. H. ROSE.

M. F. Reich has shown that pulverised quartz expels nitric acid from nitrates, especially from alkaline nitrates, at a barely visible red heat. This reaction may be utilised in estimating nitric acid by difference; for which purpose the nitrate is heated with four or six times its weight of powdered quartz.

It is better to use quartz than bichromate of potash, because the mass calcines without melting, and there is no fear of its projecting pieces of the mass. The presence of chlorides and sulphates are no inconvenience; nitrates only are decomposed. Amorphous and crystallised silica behave in almost exactly the same way.

Silica may be replaced by bichromate of potash in the estimation of carbonic acid; to expel all the carbonic acid a higher temperature is necessary than that required for the decomposition of nitrates; however, the red heat produced by Bunsen's simple gas jet is sufficient.—*Chem. News, Lond., April 4, 1863, from Poggendorff's Annalen der Physik und Chemie, vol. cxvi., p. 635.*

THE EFFECTS OF SULPHURET OF CARBON ON HEALTH.

The symptoms caused by sulphuret of carbon are peculiarly severe, and the situation of the workers really most miserable. Few of the workers marry, as it is well known that those who habitually work among these fumes rarely or never have children, and the malady is one which will only succumb to good air and rest, and total exclusion from the work-sheds. The head is much affected, and partial insanity is far from uncommon. The sight is troubled frequently. The taste is vitiated, so that most things appear to taste of sulphur. The hearing is likewise affected, and the digestive functions are sometimes strangely excited, though this latter symptom is less frequent than the others. Appetite is increased to the verge of gluttony, and nausea is almost invariable. The breathing and the circulation are injured, and most, if not all, of the secretive functions are disordered in a very alarming manner. In fact, the wretched people—we can

give them no other name—who work with this agent are miserable to themselves and the world; they live in pain and trouble of both body and mind, with no hope or expectation of cure so long as they continue at their particular occupation. As to the remedies to be taken for alleviation of these misfortunes, baths, good air, a few simple medicines, and a country life—of course necessitating total abstinence from the poisonous works—have been found most efficacious. The power and density of the fumes may be better appreciated, when we state that in many cases the sheds are merely roofs supported by poles, and open to every breeze or gale that blows. M. Delpech does not appear to propose any method for ameliorating the condition of the workpeople. He mentions that the injury is due entirely to sulphuret of carbon; not to the chloride of sulphur; and says that phosphorus has had a beneficial effect in many cases of “depression.” In fact, it would, we suppose, be almost impossible to do anything except abolish the process, and as this cannot be effected, it only remains for scientific men to discover some agent which will produce the same results in the arts, without any of the great and certain dangers of sulphuret of carbon. There are many minds at work on this project, but as yet no practical result has been secured.—*Chemical News, London, May 2, 1863, from Social Science Review.*

ON THE PREPARATION OF ASSAFŒTIDA, ETC.

BY BARNARD S. PROCTOR.

The fetid gum resins, assafoetida, galbanum, and sagapenum, are directed by the Pharmacopœia to be prepared for medicinal use by boiling in a sufficient quantity of water to cover the lumps of gum, and, when mixed and strained, evaporating till the gum becomes hard upon cooling. There could scarcely have been devised a process more likely to deprive them of their odor and medicinal properties, which reside in great measure, if not entirely, in the essential oil.

Had we desired to produce aqua foetida, we should have proceeded in the same manner, only condensing the vapors given off from the mixed assafoetida and water, and would reasonably have expected to find the distillate possessed of the medicinal

properties of the drug operated upon ; which expectation is justified by the fact that the essential oil, which constitutes about 3 to 6 per cent. of assafoetida, readily passes over with the vapor of boiling water, and, like the other essential oils, has considerable solubility. The quantity of active matter thus abstracted must be much greater in proportion than the impurities which the process is designed to remove. The present Pharmacopœia, in various of its formulæ, directs the use of these prepared gums, to the exclusion of the drugs in their natural state ; it would have been much better to have directed that all samples of these articles, depending for their activity upon the volatile matters they contain, should be rejected if so impure as to require subjection to this questionable process of improvement.

Powdering and sifting will separate a considerable proportion of the ordinary impurities ; but powdering is troublesome on account of its requiring a frigid temperature, unless the material has been subjected to a process of desiccation, almost as objectionable as melting and straining.

The friability of this class of bodies is much increased by the addition of a small proportion of calcined magnesia,—so much so, that they may be readily powdered at ordinary temperatures ; and the powder, when obtained, has not that great tendency to agglomerate which is so troublesome in assafoetida, &c. Several samples of these gums upon which I have experimented have required from 4 to 10 per cent. of magnesia to produce the requisite degree of brittleness. The gums may be softened by water-bath heat, and the magnesia stirred in ; when sufficiently mixed, and allowed to cool, they may be readily powdered.

The powder thus obtained has the full odor of the crude drug ; and though, if disposed to be hypercritical, we might say that it was adulterated, it is doubtless a better preparation than that of the P. L.

Pulv. pil. galbani co. is a desideratum at the dispensing counter, and may be readily prepared with powders obtained as above. Supposing the galbanum, sagapenum, and assafoetida each to contain 5 per cent. of magnesia, the formula would stand thus :—

Pulv. Galbani c. Magnes.	ʒii.	gr. vi.
“ Sagapeni c. Magnes,	ʒiii.	gr. ix.
“ Assafœtidæ c. Magnes.	ʒi.	gr. iii.
“ Myrrhæ	ʒiii.	
“ Saponis	ʒij.	

The proportion of the gums in this powder are as near as need be the same as in the Pharmacopœia pill mass, the magnesia taking the place of the treacle; consequently, when required for dispensing with essential oils or soft extracts, an equal quantity of it may be used in place of the mass prescribed.

If a pulv. pro pil. galb. co. is required, the same formula, omitting the soap, will produce it, all that is required being the addition of the soft soap and treacle when the mass is wanted; the small quantity of magnesia present being more than compensated for by the superior quality of the powders obtained by its use.—*Chemist and Druggist, London, April 13, 1863.*

ACTION OF SULPHURIC ACID UPON LEAD.

Messrs. T Crace Calvert and R. Johnson have lately been engaged upon a series of experiments to ascertain whether the opinion generally held respecting the diminished action of acids on metals in proportion to their purity is really correct or not as regards lead. They justly thought that it might be interesting in a scientific point of view, as well as practically useful to study the action of acids, and especially that of sulphuric acid, upon some of the leads of commerce, which, as is well known, are largely employed, in the construction of those immense chambers in which sulphuric acid is manufactured. The results of their experiments leave no doubt that the purer the lead, the more it is attacked. “The experiments,” to quote the words of the authors, were all repeated many times; we varied the surfaces of lead, the quantities of acid, the temperature, the duration of action, and, in fact, all the conditions of the experiments; and yet we always obtained similar results, from which we draw the following conclusions:—

First, and this is the principal point to which we invite the attention of scientific as well as practical men. Of the various kinds of lead existing in commerce, the purer they are the more

they are acted upon by the sulphuric acid. Lead chemically pure is more acted upon than any of the others.

2. Although it is stated in many chemical works that sulphuric acid only acts sensibly upon lead at a temperature above 383° , our experiment tend to prove the contrary, since we find that acid of sp. gr. 1.842 dissolves *cold* 67, 134, and even 201 grammes of lead per square metre of surface; and, in another instance, that acid of sp. gr. 1.705 takes from the same surface 54, 56, and 59 grammes of lead at a temperature of about 120° only.

3. Finally, the action of sulphuric acid upon lead appears, at least when there is no continuous agitation of the mass, not to increase in proportion to the quantity of acid employed. This is probably due to the formation of a layer of sulphate of lead, which protects to a great extent the surface from further action by the acid.*

The analyses made appear to point to *tin* as the metal which enables the impure lead to resist the action of sulphuric acid. To discover whether tin is really the protecting metal, and in what proportions it should exist in the mixture, is the object of a new set of experiments upon which the authors are now engaged.—*Chemist and Druggist, London, April, 15, 1863.*

OXALIC ACID FROM SAWDUST.

At the last Pharmaceutical Meeting, Edinburgh, Dr. Murray Thomson, F.R.S.E., read a paper on Mr. Dale's new method for the manufacture of oxalic acid.† The idea of making oxalic acid by acting on sawdust with an alkali was not quite new on the part of Mr. Dale, as in 1829 M. Gay-Lussac published a memoir, in which he announced that M. Vauquelin had converted pectic acid into oxalic acid, by heating the former along with caustic potassa in a crucible. M. Gay-Lussac followed up this discovery by a number of experiments, in which he demonstrated that when a number of substances were treated with potassa they yielded oxalic acid. Among the substances he tried were cotton,

* *Mechanic's Magazine.*

† Reported in *Pharm. Journal.*

sugar, starch, and gum. Any of them, when heated with caustic potassa or soda, gave off hydrogen gas, while the mixture charred; and at length oxalate of potassa or soda was found in the black residue, and could easily be dissolved out of it.

Gay-Lussac tried a number of the vegetable acids, and showed that these might be converted into oxalic acid without charring of the mixture ensuing, and on that circumstance he tried to form an explanation of the process.

But although the memoir of Gay-Lussac had been published for twenty years, no one had proposed using it as a source of oxalic acid on the large scale until Mr. Dale did two or three years ago. And although Gay-Lussac was the first to broach this method of making oxalic acid, it must not be thought that his memoir showed a way by which this result might be obtained free of obstacles; for Mr. Dale found that there was more than one practical difficulty to be overcome before he reached a successful issue. One of the chief of these was that Mr. Dale did not find the sawdust, when heated with caustic soda, was converted into oxalate of soda, as Gay-Lussac would imply. He says that soda or potassa may be used indifferently, but Mr. Dale found that with soda sawdust yielded almost no oxalic acid; while, on the other hand, he was precluded from using potassa on the large scale on account of its high price, though he was quite successful when he used it. At last this difficulty was overcome by using a mixture of soda and potassa, in the proportion of two equivalents of the former to one of the latter; and this, it was found, was as effective as potassa alone. The practical details of the process are as follows:—

1. The alkalis, mixed in the above proportion, are dissolved, and the solution evaporated until of specific gravity 1.35; sawdust is now stirred in until a thick paste results.

2. This paste is then heated on iron plates, during which it is constantly stirred; water is first given off; the mass then swells; inflammable gases, hydrogen and carburetted hydrogen are evolved, along with a peculiar aromatic odor. When the temperature has been maintained at 400° for one or two hours, this stage of the process is complete; the mass has now a dark color, and contains only 1 to 4 per cent. of oxalic acid, and about 0.5 per cent. of formic. The bulk, therefore, of the

mass at this stage consists of a substance whose nature is not yet known, but which is intermediate between the cellulose and oxalic acid.

3. The next stage consists in a single extension of the last, in which the mass is heated till quite dry, care being taken that no charring takes place. It now contains the maximum quantity of oxalic acid, 28 to 30 per cent.

4. This oxalic acid is now combined with both potassa and soda in the grey powder resulting from stage 3. This powder is now washed on a filter with solution of carbonate of soda, which seems to have the singular and unexpected power of decomposing the oxalate of potassa, and converting it into oxalate of soda. At all events, it is quite true that all traces of potassa are washed out with the solution of carbonate of soda. The only explanation that occurs to account for this unusual decomposition is that oxalate of soda is a more insoluble salt than oxalate of potassa, and therefore may be formed by preference.

5. This oxalate of soda is now decomposed by boiling milk of lime. Oxalate of lime falls as a precipitate, and soda remains in solution. This soda is boiled down, and again made use of with fresh sawdust. This recovery of alkali is also practised with the potassa salt which filters through in the last stage.

6. The oxalate of lime is now decomposed in leaden vessels with sulphuric acid. Sulphate of lime is precipitated, and oxalic acid is in solution, which is now evaporated, and the acid separates in crystals, which now need only to be recrystallized to make them quite pure, and fit the acid for all the purposes for which it is employed.

By this ingenious process 2 lbs. of sawdust are made to yield 1 lb. of oxalic acid, and the amount of acid which can be turned out in a week amounts to 9 tons; but the works of Messrs. Roberts, Dale & Co., (near Manchester) could make nearly double that amount. This amount is more than half of all the oxalic acid which is reckoned to be used all over the world. The process also has so much cheapened the price of oxalic acid, that in 1851 it sold for 16*d.* per pound, and now it only costs from 8*d.* to 9*d.* per lb.—*Chemist and Druggist, London, April 15, 1863.*

DISINFECTANTS AND THEIR APPLICATION TO
THERAPEUTICS.

Conclusions from facts contained in a memoir upon this subject published in *Archives Générales*, by O. REVEIL, Professeur agrégé à la Faculté de Médecine et à l'école supérieure de Pharmacie, &c., &c.

1st. That there probably exist many kinds of putrid fermentations, varying in their causes as in their effects ;

2d. That there is no general disinfectant capable of being indiscriminately used in all cases ;

3d. That liquid disinfectants are always preferable to others, other things being equal, when applied in therapeutics.

In their application to this purpose regard should be paid to their cost, the facility of their employment and the inconveniences they may cause by corroding, soiling or rendering unserviceable the linen dressings.

4th. The best disinfectant is that which possesses the following properties :—it should—A. Instantly destroy or mask bad odors ; B. Absorb the liquid or gaseous products of the putrefactive or inflammatory process, remove them by washing, and destroy the poisonous or irritating action of morbid liquids and mephitic gaseous products ; C. Hasten the cicatrization of sores, by giving the necessary vitality for the reparation of the tissues.

5th. Chlorine and solutions of bromine and iodine appear to best fulfil the most important of these conditions.

6th. Chlorine, or at least the hypochlorites, by reason of the gaseous state of their active principle, ought always to be preferred when it is desired to destroy miasm and disinfect the air.

7th. The addition of odorous essences, and principally of nitro-benzine to the hypochlorites and to iodine and bromine water, acts both to mask the disagreeable odors and to set into immediate operation the chemical action.

8th. Tar and coal-tar preparations are able to render effectual service, but they do not possess the property, like iodine and bromine, of destroying the poisonous action of morbid products and putrefaction, or that of various kinds of virus.

9th. *Charpie carbonifère*, and especially *charpie carbonifère iodée*, may be often employed with success.

10th. Carbon, in addition to its absorbent properties, appears to exercise *an action of special contact*, in virtue of which it hastens the destruction of organic matters, or rather, as M. Stenhouse states, according to the experience of Turnbull and Turner, by condensing the oxygen of the air, and thus acting as spongy platinum.

11th. Metallic solutions (salts of iron, zinc, &c.), although imperfect disinfectants, suffice in a great number of cases.

12th. Physical and mechanical agents (ventilators, &c.) may be made powerful aids to chemical disinfectants.

13th. There are some causes of *infection* which appear to resist all treatment (ozæna, otitis, &c.)

14th. We should add, moreover, that there are causes of *infection* which it would be dangerous to suppress (*sueur infecte des pieds*), and the odor of which we should endeavor to mask.

One is struck with admiration on reflecting upon the processes which nature employs to disseminate, transform and reproduce organic matters; in the presence of the grandeur of these facts we remain convinced of the exactitude of the aphorism of Lavoisier:—" *Dans la nature, rien ne se perd, rien ne se crée.*"—*Boston Med. and Surg. Journ. May 14, 1863.*

MEDICATED CIGARETTES.

BY W. E. BOWMAN, M. D.

Cigarettes may be made of almost any variety of thick paper, but that kind should be selected that on burning yields a smoke most easily inhaled. I have always employed the heavy paper used for copy book covers (olive pressings); thick blotting paper however makes a good cigarette, but the regular filtering paper does not answer, as its smoke is dense and suffocating.

First, cut the paper into strips about seven inches long and an inch and a quarter wide, and next ascertain exactly how much fluid it requires to saturate 25 of these pieces. This is readily done by soaking them in an exactly measured ounce of water, when on withdrawal it will be found that above five fluid drachms of the liquid has been imbibed, this will give the key to the strength you are to make the solutions.

Next saturate the slips with the remedy, and when nearly dry, gum or paste one border of each and roll it around a pencil; afterwards withdraw the pencil, and the cigarette is made.

Arsenical Cigarettes.—Boil 25 grains of arsenious acid (the lump broken up is purest) in a Florence flask with four ounces of water, down to the quantity required to saturate 100 slips of the paper previous to rolling. They will then contain a quarter of a grain each. If you have not the usual apparatus, hang the flask above some live coals by means of a wire.

Mercurial Cigarettes.—Dissolve three drachms of red precipitate, in three drachms of nitric acid, and add enough water to make up the quantity requisite to saturate 100 slips of paper. They will contain about three grains of the nitrate of mercury.

Nitre Cigarettes.—Dip the paper in a saturated solution of the nitrate of potash, before rolling.

Balsamic Cigarettes are made by giving the dried nitre cigarettes a coating of tincture of benzoin.

In the British Medical Journal, Dr. Nevins of the Royal Infirmary School of Medicine, Liverpool, speaks highly of these cigarettes in a number of cases.

Aphonia.—A patient who could not speak above a whisper for over a year, probably due to a thickened condition of the chordæ vocales, as she had no pain or constitutional symptoms, used the mercurial cigarettes for a month, and perfectly recovered.

Offensive Discharges from the Nostrils, with a sense of uneasiness in the frontal sinuses, was quite cured in about a month with the mercurial cigarettes. The patient held his nose after taking a mouthful of the smoke, and then forced it into his nostrils in the manner practised by accomplished smokers.

Polypus in the Nose.—A patient who had been twice operated upon for polypus, is now able to keep the disposition to form fresh polypi in check, by smoking the mercurial cigarette in the same manner, when he feels that uneasiness which warns him of the danger of its recurrence.

Deafness.—When dependant upon an obstructed Eustachian tube, he finds the nitre cigarettes, made with brown paper, most successful, and that the smoke forced into the tympanum from the throat, gradually restores the sense of hearing. The circum-

stance which first led him to adopt this method, was hearing a deaf person on one occasion remark, that when he was sneezing the day before, he heard perfectly ; the violent effort appeared for the moment to have dilated the Eustachian tube, and hearing was the result. He says, that in a deafness of seven years standing, he had benefitted a patient more by this treatment than by any other.

Phthisis.—Trousseau long ago, recommended a puff or two of an arsenical cigarette twice or three times a day in phthisis.

When the attention of the profession has been duly aroused to this subject, there will doubtless be found many other affections in which medicated cigarettes may be advantageously employed, as in syphilitic ulcerations of the throat, ozaena, offensive breath, obstruction of the lachrymal duct, diphtheria, &c. &c.—*Canada Lancet*, May 15, 1863.

ON THE SUPPLY OF QUININE, AND THE CULTIVATION OF CINCHONA PLANTS IN INDIA.

BY CLEMENT R. MARKHAM,

The gentleman specially charged by the British Government with the introduction of these valuable plants into that country.

The original paper is too long and detailed to be transferred to our pages in its entirety, but we shall give an abstract of the most important items of information contained in it. Mr. Markham commenced by adverting to the inestimable benefits accruing to the inhabitants of almost every portion of the civilised world from the use of the cinchona alkaloids as febrifuges. The lecturer then gave a detailed account of the districts especially fitted by Nature for producing this genus of plants. It extends along the line of the Cordilleras of the Andes for a distance of 1740 miles of latitude on each side of the equator, and passes through four of the South American Republics, namely, New Granada, Ecuador, Peru, and Bolivia, beyond which regions the cinchona plant has not as yet been found growing naturally. The result of the certainty of possessing so close a monopoly has been most disastrous. The inhabitants of these countries appear to have rivalled each other in their reckless destruction of the trees for the sake of their bark with a

view to immediate profit only, no system of cultivation or plantation having ever been so much as thought of. Commencing with the northernmost portion of the bark region in New Granada, Mr. Markham states that wild work has been going on there for many years past, the destruction of the trees of the most valuable kinds having become so general, that in 1855 the supplies began to fall off, and although, on account of the last civil war, the forests have had a respite, and small cargoes of bark are beginning to be exported once more from Carthagena, still in a few years the supplies will once more fail. The once invaluable forests of Ecuador on the western slopes of Chimborazo, and on the Loxa mountains, are actually extirpated, fulfilling the prophecies of Condamine and Ulloa, who warned the bark collectors that they were killing the goose with the golden eggs. Even in Humboldt's time the work of destruction had so far progressed that the original variety of the plant first discovered by Condamine, and sent by him to Linnæus, had almost disappeared. The once large forests of the *Cinchona succirubra*, or "red bark" of commerce, are almost entirely devastated, and, on the authority of Mr. Spruce, the botanist, who accompanied Mr. Markham to that district, it is stated that little or no red bark will be exported from that country during the present year. Peru, the very country which gave the name "Peruvian bark" to this invaluable medicament, has almost ceased to supply any of it; fifteen or twenty years of ruthless tree slaughter having resulted in the extermination of the most valuable of the tribe, the *Cinchona Calisaya*. Mr. Markham struggled for days and days through the forest regions of Carabaya in search of this once common, though precious variety, without meeting with one specimen higher than six feet, the beautiful crests of brilliant foliage and sweet-smelling flowers that formerly overtopped the highest trees of the forest having long since disappeared. Bolivia appears to have been only slightly behind her neighbors in this suicidal work. The supplies of Calisaya bark from this country are rapidly being worked out. The Bolivian legislature has, however, from time to time endeavored to check the extinction of this branch of commerce by stringent legislative enactments, but the decrees have either not been rigidly enforced, or else they have been

abrogated. Dr. Weddell tells us that at the centre of what was formerly the chief bark-collecting district, the surrounding forests are now quite cleared of cinchona trees, and that it is necessary to seek them at a distance of ten or twelve days' journey from any inhabited locality. These facts are sufficient to show the amount of danger threatening the bark trade of South America. It must, however, be distinctly understood that the great peril does not consist so much in the total extirpation of the cinchona genus (for this would be beyond the power of even the most reckless of the *cascailleros*), but in the indiscriminate destruction of all trees above the size of a small sapling. The number and size of the trees being thus diminished, the result will be the stoppage of the supplies during several years, and at frequent intervals, rendering quinine a still more costly luxury than it is at present, and quite beyond the reach of thousands, whose lives would be sacrificed from inability to secure it. To an ordinary observer the remedy for this state of things would seem to be stringent forest laws, backed by European capital and enterprise. But the unsettled state of these countries, and the impossibility of procuring adequate labor when required, present insurmountable difficulties. The consequences of a failure or even a diminution in the supply of quinine would result in the most disastrous consequences to the tropical possessions of the British Crown. It is not too much to say that our rule in India is built on cinchona bark, and a quinine famine in that country would be destructive to Europeans as the food famine was to the natives a short time since. Hence the incalculable importance of introducing the cinchona plant into India. For more than twenty years the late Dr. Royle and a host of other scientific men of eminence endeavored to render the British and Indian Governments alive to this great fact, but it was not until the matter was laid before that enlightened young statesman, Lord Stanley, in 1859, that any decisive steps were taken. An expedition was formed under the superintendence of Mr. Markham for the collection of cinchona plants and seeds of all the valuable species in South America, and for their introduction into India. The difficulties in the way of accomplishing this great work were simply almost insuperable; but the energy and determination of Mr.

Markham and his companions, Messrs. Spruce, Prichett, Cross, and Weir, overcame every obstacle, and there are now growing in the Neilgherry Hills and in other parts of India some 130,000 flourishing young cinchona plants of the most valuable species. The greatest possible discrimination had to be exercised with regard to the species to be collected, all the valuable kinds having been obtained, and the worthless sorts having to be rejected. It must also be remembered that the cinchona had never been cultivated, that its conditions of growth were undiscovered, and that it grows in forests scarcely ever visited by any European. These forests are approached by paths which skirt the edges of perpendicular precipices, and pass through regions of perpetual snow and bleak wilderness, destitute of all the resources needed by the traveller. To add to all this, the forests themselves are close masses of tangled fever-haunted vegetation, so closely matted that every foot of way had to be hewn out. These obstacles would surely have deterred less courageous men than Mr. Markham and his companions from prosecuting the objects of their search; but they endured more than these, for the inhabitants of the country put every conceivable difficulty in their way of finding cinchona localities. When once reached, the forests were found to be utterly denuded of cinchona-trees, nothing being left but a few inconspicuous shrubs, as easily discoverable as a needle in a bundle of hay. By March, 1862, the objects of the expedition were gained, and the whole of the plants and seeds were deposited in the Neilgherry Hills in Southern India, under the charge of Mr. McIvor and his able assistants. In addition to the above-mentioned plants and seeds, they also received six fine plants of *C. calisaya* from Sir W. Hooker, a specimen of *C. officinalis* from Mr. J. E. Howard, the eminent quinologist, besides several other specimens, including one of the species yielding the Carthagena bark of commerce from the Dutch plantations in Java. The kinds now growing in the Neilgherry Hills embrace all that are considered valuable in commerce. The success and well-being of the plantations in India are due entirely to Mr. McIvor, aided by the invaluable advice and information rendered by Mr. Markham and his coadjutors as to the nature of the habitat of the plants. The spots selected for the plantations were fixed on only after

much study and careful examination of soil, elevation, temperature, and general meteorological conditions. The sites chosen resemble as closely as possible in these respects those in South America in which the different species are found, the only fear at first being the amount of moisture natural to the district might not be sufficient for the requirements of the plants; but as they have weathered two very dry seasons, all anxiety on that score is at an end. During the first year the operations were confined to the propagation of the plants under glass; and owing to the great talent shown by Mr. McIvor in this branch of scientific botany, he has been able to increase his stock of plants from 8613, in January, 1862, to nearly 13,000 in January, 1863. The plants planted out in the open air are in a very flourishing condition, and cover 745 acres. The Government intends planting 150 acres annually for ten years with the plants grown in the propagating houses, besides which numbers have been sent to Darjeeling to form a nursery, to Travancore, to Ceylon, and to other parts of India. Mr. Markham then drew the grand distinction between mere transplantation and true cultivation, which consists not merely in imitating the surrounding circumstances of the plant in its wild condition, but also in removing the adverse influences which also act upon it in its native forests. The Dutch, in establishing cinchona plantations in Java, appear to have somewhat erred in this particular, by placing it in a forest under dense shade, forgetting that all forest plants necessarily suffer from want of light and air. The successful rearing and transplantation of the cinchonas having been attained, it remained to determine the way in which the harvests of bark should be secured; whether, in fact, they should be reared as bushy shrubs or tall trees. The former alternative was decided on; the cinchonas will therefore be treated as shrubs, the yearly harvest of bark being obtained by simply lopping and pruning, by which they will be rather benefited than injured. Mr. McIvor calculates that the plants will begin to yield quill bark when about six years old until their twelfth year, when a large proportion will be *plancha*, or flat bark. With regard to the amount of alkaloids yielded by the wild bark it is stated to be from three to five per cent. From the cultivated bark, when grown under every advantage that science and

practical experience can suggest, the yield ought to be greater. A microscopic portion of bark grown in the Neilgherries was lately submitted to Mr. J. E. Howard for analysis, and as far as so small a piece would enable him to do so, he obtained a satisfactory result. Mr. Markham then entered largely into the commercial advantages to be gained by the cultivation of the cinchona plants by private individuals, who can be supplied from the Government plantations at a merely nominal price. When it is considered that a pound of red bark may be produced for 3d. which will sell in the London market at from 2s. 6d. to 8s., there is every reason to think that men of business in India will not neglect so promising an investment. The lecturer concluded by enumerating the numerous advantages certain to result from the successful introduction of cinchona plants into India. It is well known that intermittent fever now makes fearful havoc amongst the natives of certain districts who are quite beyond the reach of the healing bark. There will be shortly no reason why the poorest ryot should not have a cinchona tree behind his hut, the green bark of which is, according to Dr. Poeppig, as excellent a remedy for fever as the extracted alkaloid. As an additional article of commerce it will of course be a valuable addition in a trade point of view, but from the benefits which the growth of the bark trees will confer on the native population, Mr. Markham prophesies that before many years they will be regarded as the sacred dwelling-places of the Indian gods of healing, Rishi and Aghastya.

During the discussion several interesting facts were mentioned by the various speakers.

The Chairman, Dr. Chambers, suggested that under proper cultivation many of the cinchonas now worthless might be made to yield as large a quantity of alkaloid as the best varieties. He also mentioned that many hospitals and dispensaries were unable to give quinine to their out-patients on account of its high price, so that a large portion of the poorer population were deprived of the use of this excellent drug.

Mr. J. E. Howard considered the Indian experiment to be a decided success, but warned commercial speculators against entering too rashly into schemes for cinchona cultivation. The very first thing to be considered was to procure the proper

species of trees, the best, in his opinion, being the *Calisaya* varieties. He then entered into particulars of influences of soil and locality on the production of different amounts of quinine by the same species, and concluded by passing a high eulogium on Mr. Markham and his companions.

Mr. S. L. Howard reminded the meeting that the salts of cinchonine, an alkaloid at one time thought to be as valuable as quinine, had been made the subject of experiment as febrifuges by several eminent medical men with great success, although many others were prejudiced against them. He thought it highly important that they should be tried as tonics and febrifuges both at home and in India, being much cheaper than the corresponding quinine compounds. He urged the necessity of proving absolutely their value or worthlessness at once, as the bark containing them could be readily procured while they were waiting for the Indian plantations to arrive at maturity.

Mr. P. L. Simmonds gave some interesting statistics of the bark and quinine trade. He also mentioned that the cinchona was in experimental cultivation in the Botanic Gardens, Jamaica, and expressed his surprise that France, Spain, and other countries having colonial possessions with suitable climate and elevations of country, had not turned their attention to its introduction.

Mr. Daniel Hanbury stated that the *C. condaminea* yielded as a shrub a Loxa bark exceedingly poor in alkaloids, while the broad tree bark was so rich as to give the almost worthless shrub bark now obtained a kind of hereditary reputation.

Mr. J. E. Howard, in reply, said that although this was the case with the bark of the *C. condaminea* it was almost the direct contrary with the *C. calisaya*, the species he so strongly recommended for cultivation in India, the small quills often yielding a higher percentage than the flat bark of the larger trees. He severely criticised the neglect of the Government in allowing Mr. Markham, with his valuable cargo, to find his way from Peru to India the best way he could, instead of sending a steamer to convey him from shore to shore. Many of the most valuable plants were irrecoverably lost to India through having perished on their way thither through the cold climate of Europe.

Dr. Seeman said that, knowing the cinchona districts as well as he did, he could better appreciate than describe the enormous difficulties Mr. Markham had surmounted, to whom the greatest honor was due for carrying out so well the noble purposes of the expedition.

A unanimous vote of thanks to Mr. Markham was carried with acclamation.—*Chem. News, Lond. April 25, 1863.*

AMERICAN PHARMACEUTICAL ASSOCIATION.

The Tenth Annual Meeting of the American Pharmaceutical Association will be held in the city of Baltimore, Maryland, on Tuesday, the 8th day of September, 1863, at three o'clock, P. M.

After taking counsel with members of the Executive Committee, and other prominent members of the Association in various parts of the country, and duly weighing an invitation to meet at Pittsburgh, it was determined to accept the prior official invitation of the Maryland College of Pharmacy. A meeting in Baltimore, it was thought, would be better attended at the present time than in any western location. In view of this decision, the members generally are earnestly invited to keep in memory the various interests of the Association, that should be developed at the Annual Meeting; the several standing Committees are encouraged to early prepare their reports, and those members who accepted subjects for investigation at the Philadelphia meeting last year, are particularly invited to have their papers ready, and, in the event of not attending the meeting, to forward them to the President of the Association, care of Andrews & Thompson, Pharmacutists, Baltimore.

The objects of the Association are fully explained in Article 1st of the Constitution; the conditions of membership are in Article 2d. "Every pharmacist or druggist of good moral character and professional standing, whether in business on his own account, retired from business, or employed by another, who, after duly considering the objects of the Association, and the obligations of its Constitution, is willing to subscribe to them, is eligible to membership." Pharmacutists and druggists desirous of membership, may obtain further information, and a copy of the Constitution, by applying to the Chairman of the Executive Committee, Edward Parrish, 800 Arch St., Philadelphia. All applications for membership should, when possible, be in the hands of the Executive Committee at the opening of the first session.

WILLIAM PROCTER, JR., *President.*

Philadelphia, April 20th, 1863.

Editorial Department.

MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.—The aspect of the political horizon, though not favorable to our next meeting, will, we trust, become more encouraging long before that period arrives. The members will do well to proceed with their investigations and get their papers ready, so that when the meeting convenes, there will be something to engage its attention. We know how prone men are to be attracted from their ordinary duties by the occurrence of such events as are now happening near us, yet while prepared to do our duty as citizens, we should not forget that our duty as pharmacutists is to sustain our National Association.

THE U. S. ARMY LABORATORY AT PHILADELPHIA.—Since our last notice of this enterprise of Surgeon-General Hammond's, we have twice visited the laboratory, where Dr. A. K. Smith, U. S. Army, the Director, and Prof. Maisch, the Chemist, politely showed us the several departments at present in operation. The Laboratory buildings are those formerly occupied by Crew, Rogers & Crew, for their chemical works, at Sixth and Oxford Sts. The main building has three stories, with a large one story building attached, and several detached structures for special purposes. All the heating in the main building is effected by steam, except such as is performed by gas burners. A twenty-five horse power engine, with appropriate boilers is erected in a position central to the laboratory operating rooms, and yet separate. Immediately above the boilers, and deriving its heat from them, is the drying room, which opens by a door into the mill or powdering room. In the latter there are at present two pairs of chasers, and one Bogardus' mill. Two more pairs of chasers are to be erected in a short time. Mr. Maisch informs us that he has succeeded in getting his bolting machine to operate very successfully. In this room is also the machine for making the preparations of *free* metallic mercury, as blue pills, mercurial ointment, etc., by shaking, as described and used by Dr. Squibb, except that the plan of the machine is more simple. In this room, all the fine powders, as ipecac, rhubarb, jalap, etc., are prepared, and sent up stairs to be bottled, whilst the chief occupation of the mill is in preparing drugs for percolation. Proceeding eastward from the mill room, the visitor enters the general operating room for Pharmaceutical and Chemical processes;

commencing with the percolators, which are adjacent to the mill room, the processes become more chemical towards the further end, the visitor can here witness the concentration of liquids on water baths, and in stills for fluid and solid extracts, preparations of morphia, and for the crystallization of salts. The preparation of the officinal solutions of ammonia, is conducted here also, but apart from the other processes.

The large percolators are constituted of wood, lined with tinned copper, varying in capacity from 260 gallons to 150 gallons. Besides these, vessels of smaller size, constructed of tinned iron, are in use for lesser operations. 280 pounds of colocynth, and 600 pounds of valerian are percolated at one operation. These wooden percolators are arranged on a stage, on a level with, and connected with the mill room, so as to be easily charged. Each percolator has a manhole in front near the bottom, closed by clamps and screws, through which the exhausted material is extracted after each operation. Hanging in front of each percolator is a black-board, on which is written the leading facts of each operation as they are developed, such as name and quantity of material, menstruum, and percolate, with remarks when necessary. Along the eastern end, a range of jacketted steam evaporators are in operation and jacketted stills. In a detached brick building, on the north side of the lot is the room for furnace operations, including the preparation of oil of wine, which will be made in eight gallon retorts, on sand baths. Here the oxidation and solution of metals, and numerous other operations involving direct heat, will be conducted. In the centre of the area, a building is being constructed specially for the manufacture and bottling of ether, sweet spirits of nitre, and chloroform, with a subterranean store-room. Steam heat only will be used, and no light or fire of any kind allowed in the building. The apparatus for ether will be that of Dr. Squibb, described before in this Journal. By thus isolating these articles, much of the usual danger of fire will be avoided. Ample space remains in the yard for extending the buildings if required.

Returning to the main building, we find the storekeeper's room next to the mill room on the first floor, and north of this, other rooms, among which are the office and Mr. Maisch's private analytical laboratory, neatly fitted up with apparatus needed in the examination of drugs and chemicals previous to their purchase, when required. On the second floor north is the sewing machine room, in which twelve girls and a cutter, operating ten sewing machines, make one thousand linen sheets daily, and pillow cases, towels, and other items required in the army hospitals. On the opposite end of the building is the filling room, where all powders, salts, pills, and other dry substances are put up in bottles for the medicine chests; and in a similar room directly above this all the various fluid extracts, tinctures, and other liquids are bottled and labelled, each kind put up by itself on shelves for temporary storage, above the counter. The work in these two rooms occupy twelve girls, besides six others engaged in washing the bottles. In the *pill* room, four girls are engaged in making

pills. At present the common pill machine only is employed, the composition and formation of the mass is superintended by a Graduate in Pharmacy. The pills made are pil. opii, pil. cathart., comp. and pil. hydrarg., U. S. P; and pil. camphoræ et opii, pil. colocynth comp. et ipecac, and pil. quiniæ sulph. *aa* 3 grs.

It should be understood that the medical supply table for the army is by no means so comprehensive as the Pharmacopœia, and consequently the scope of operations is confined chiefly to those preparations on the list. It is intended to make Ceratum Simp., Cantharidis, and Resinæ, and, as soon as arrangements can be made, to spread adhesive plaster and isinglass plaster for the entire army. Morphia will also be made to an extent adequate to the wants of the whole army. It has been determined to manufacture sulphate of quinia, and soon as the *bark* arrives this will be commenced, and the experiment of its economy made. About two hundred serons of Cinchona have been purchased.

The basement of the main building is paved with brick throughout, and is used for storing and bottling liquors, and fixed oils. Three girls attend to the bottling of liquors. The medical store wagons and panniers are filled at the laboratory, but made elsewhere. The bottles used are all marked in the moulding "U. S. A. Hosp. Dep.," and are furnished from Pittsburgh. Each bottle of any size is enclosed in a square pasteboard box surrounded with sawdust or rice husks, and these closely packed in wooden boxes appropriately marked, and then conveyed to the storehouse at Sixth and Master Streets.

All drugs are purchased on the requisition of the Director, Dr. Smith, by an order from the medical purveyor (Dr. Robert Murray, U. S. A.) to a drug broker, it being clearly understood that all purchases are subject to the inspection and analysis of Mr. Maisch.

Such is a hasty view of this new enterprise. So far, we are informed, on many leading articles great economy has attended the experiments, and all has been well done. In the sewing machine department, since operations commenced, Dr. Smith says that they have paid for the machines, and saved the Government \$1200 besides! Of course it will take a longer period to determine the actual facts of the case, but there can be but little doubt of the expediency of the measure, whilst the necessity for large supplies exists, and under the care of such earnest workers as Dr. A. K. Smith and Prof. Maisch it will receive a fair trial.

U. S. PHARMACOPŒIA.—We had hoped to have been able to present a notice of this work, which would have been published ere this, but for an expected delay of two weeks, arising out of the necessity of getting type made for expressing the accentuation in the index, as directed by the Convention at Washington. The Chairman of the Committee having objected to the appearance of any notice prior to publication, we are compelled to

postpone any commentary on the Pharmacopœia until our September issue. Meanwhile we have every reason to believe that the book will be published about the middle of July.

THE BRITISH PHARMACOPOEIA.—Through the Pharmaceutical Journal for May, page 552, we learn that the publication of this work is now retarded by the vexatious labor arising from the reconversion of the weights, in the formulæ, to troy weight value. Dr. Burrows gave a discouraging account of the difficulties surrounding the process due to the action of three distinct Sub-Committees located in London, Edinburgh, and Dublin, "giving rise to interminable alterations, suggestions, recommendations, joinders, rejoinders, replications, and so on. Dr. Farre, of the Committee, was *more hopeful*, and seemed to think there was a chance of the work being published during the present generation! When it is remembered that the British Pharmacopœia was commenced in 1857, it should make our own critics more charitable towards the presumed shortcomings of our own Pharmacopœia Committee.

WEIGHTS AND MEASURES IN ENGLAND.—Some of our English friends have a strong hankering after a decimal system of weights and measures. A Committee of Parliament has for some time been engaged in making "a full investigation of the regulations of different countries, as well as the requirements of our own country, [Great Britain,] and have arrived at the conclusion that a universal system should prevail among commercial nations, and that the French Metrical System was the best suited for general adoption." A bill is now before Parliament designed to carry out the recommendation of the Committee, which bill is printed in *extenso* in the June number of the Pharmaceutical Journal, just received. This bill makes all the measures dependant upon the metre, which it calls the "new yard" (39.37079 inches) or unit of length measure. The unit of surface measure is the square metre. The unit of measure of capacity is the litre or new quart (a cube of the one-tenth of the new yard.)

The unit of weight is the weight of a *new quart* or litre of distilled water, to be called a "kilogram," the half of which is to be the new pound. The one-thousandth of the kilogram will be called a "gram," which in decimal parts and multiples, "shall be used for weighing bullion and precious stones, and for the purposes of pharmacy."

The bill makes the use of these measures legal, three months after it becomes a law; and at the expiration of three years from that time, it shall be illegal to use any other weights or measures within the realm of Great Britain. The subject may now be considered to be open to the British public. The characteristic deliberation with which great changes are effected in England, will give ample time for the people to consider

the matter, yet it is not probable that one in ten thousand of the population will understand the merits of the bill or appreciate the amount of disturbance it will create in commercial transactions. With a just appreciation of the advantages of the decimal system in regard to multiples of the units, we yet believe the duodecimal or sexdecimal system to be far more convenient in practice, and that should the decimal system be adopted in England, it will be virtually annulled in practice, as regards the decimal fractions, by the retention of the custom of halves, quarters, eighths and sixteenths of the kilogram, using them in lieu of the present fractions of the avoirdupois pound,—in fact, the bill foreshadows this in its 5th clause, which says, “For the more convenient subdivision of weights and measures, it shall be lawful to use the double and the half of all the said units, and their principal decimal divisions and multiples, *as well as any other subordinate divisions* which the Committee of the privy council for trade *may deem expedient.*”

PROVINCIAL PHARMACY IN ENGLAND.—The working of the Pharmaceutical Society of Great Britain has long been an object of interest with some in this country. Centralization is its most prominent feature. Whilst four-fifths of its members are “provincial,” (that is, reside out of London,) nearly the whole operations of the Society are transacted in London. In a profession, the members of which are so tied to locality as are ours, it is not to be wondered at that many able and reflecting provincial pharmacutists in England feel dissatisfied with the practical working of the Society. Large sums are spent, of which they can only enjoy the fruits by going up to London. Arising out of this feeling, we find in the May number of the Pharmaceutical Journal, a paper on systematic scientific inquiry, by M. Reynolds, of Leeds. In looking around for examples of the working of national societies, he directs the attention of his readers to the “American Pharmaceutical Association,” as offering some features worthy of adoption, and refers to the volume of its Proceedings for 1859, as evidence of the advantages of the Association. The chief points aimed at by Mr. Reynolds are, 1st—to have the annual meetings of the Pharmaceutical Society held in rotation among the principal cities of Great Britain; and 2d, to adopt those features of the British Association, and the American Pharmaceutical Association, by which these bodies pursue scientific inquiry in a systematic manner, through committees and individuals, appointed annually. We believe that the engraftment of these branches into that society would effect a great revolution in the status of English “provincial” pharmacutists, and bring to bear an amount of latent ability now only needing the stimulus arising from having a distinct part to play, that will raise the scientific level of English Pharmacy far above its present average. In the United States, the most decided local advantages have arisen from simply holding an annual meeting. In Baltimore, previously

to the last meeting held there, the Maryland College of Pharmacy had almost ceased to exist. Under the stimulus of the then prospective meeting in that city, that institution was revived, a school of Pharmacy and a Journal established, and the condition of Pharmacy in that city was permanently benefitted. So of England and Scotland. Let it be known that in June, 1864, the annual meeting will be held in Liverpool, it will be found that the Pharmaceutical chemists of that city will inaugurate movements involving neighboring towns that will be fraught with permanent advantages. Let every fifth meeting be in London, and the others according to adjournment. Let the annual meeting become a scientific gathering, as well as one for the discussion of the operation of its by-laws, and depend upon it English Pharmacy will rise more rapidly than yet has been the case.

LIABILITY OF DRUGGISTS.—A curious case has been recently reported in the Cincinnati *Lancet*, for May, 1863, detailing the legal proceedings in regard to an explosion resulting from a mixture of substances ordered at a drug store in Bellefontaine, Ohio.

The plaintiff, Joseph W. Kerr, filed a petition on the 5th of October, 1861, setting forth that the defendant, Thomas S. Clason, kept an apothecary shop in Bellefontaine, Ohio, and that on the 8th day of November, A. D. 1860, at the place aforesaid, without fault or negligence on the part of plaintiff, by his unskilful and careless servant did certain injuries to the plaintiff (as specified in the petition), causing him great personal damage and expense from sickness,—for which the plaintiff asked judgment against the defendant for \$10,000.

The defendant then entered a demurrer, setting forth that the plaintiff had not shown sufficient cause for action, etc.

The Court decided against the demurrer, and referred the case to the next term; meanwhile it was compromised.

The following statement of the facts of the case was furnished by the Hon. Wm. Lawrence, of Bellefontaine, O., before whom the case was brought:

“**EDITORS LANCET AND OBSERVER:**—In the September number, 1862, of the *Western Law Monthly*, published at Cleveland, is the report of a case decided by the Court of Common Pleas of Logan County, Ohio. It is *Thomas W. Kerr vs. Joseph S. Clason*, page 488, and involves somewhat the duties and liabilities of druggists and physicians. As this case, which was pending in my court, is now compromised, it may be a matter of interest to the medical profession to know the facts of the case. They are these:

James Wallace, of Ridgeway, sent a written prescription to the drug-store of Dr. J. S. Clason, here, to be filled, which was in substance as follows:

One quart spirits turpentine,
Four ounces British oil,
Four ounces oil of spike,
Four table-spoonfuls of nitric acid.

On the 8th of November, 1860, Jonathan McCormick, a clerk in the drug-store, filled in these ingredients in a three-pound bottle, in the order above stated. It stood in the bottle nearly ten minutes, when he corked it. He then picked it up, gave it a shake, when the cork flew out, followed by a stream of fire, exploding with a loud noise and great violence. Strange as it may seem, the bottle did not break. When the contents had about half blown out of the bottle, McCormick set it down on the floor or counter. This was in the back end of the store room, say twenty-seven feet from the front end. The show windows, with bottles, etc., in the front end of the room were blown out, and glass driven into an oak post twelve feet from the windows, perhaps one-third of an inch deep. The room was filled with flame similar to a powder flash. Persons up stairs felt the shock, and say the floor was jarred up so as to rise partially. Mr. Kerr, who was standing near the bottle, say four feet from it, was covered with flame, ran out, his clothing on fire, and was sadly burned. His fingers came off his right hand. It is supposed the neck of the bottle was accidentally pointed at him. McCormick was seriously burned. The little boy, also near, was enveloped in flame, and his clothes considerably burned. All the parties recovered,—Mr. Kerr sadly disfigured. McCormick's coat, pants and vest, all of strong goods, were torn into tatters, yet did not take fire, nor was any violence done to his body seriously, though shocked and burned on his hands and face all over. The nitric acid used was "Commercial nitric acid;" the turpentine, common ordinary article. Dr. Clason thinks McCormick used sulphuric acid instead of nitric acid, as stated by McCormick. The latter, however, asserts that it was nitric acid.

This is written and approved by McCormick and Dr. Clason. McCormick says he believes if the bottle had not been corked and shaken it would not have exploded. No bottles on the shelves were broken. Wall paper in the store in rolls for sale was burned considerably, and some articles on shelves where the contents of the bottle flew were burned. The articles were all put in without shaking. Dr. Clason says he has very strict evidence that *it was sulphuric acid* that was put in, and not nitric acid—and I have no doubt this is the fact."

According to the statement, it is a matter of doubt whether SO_3 or NO_5 was used; in either case the acid would, in weighing out the ingredients, assume the lower stratum. The subsequent reaction, brought on by agitation, would be very much influenced by the nature and strength of the acid used. To produce the effects indicated, either the heat must have been sufficiently great to vaporize the turpentine, so as to form an explosive mixture with the air of the room, or gases of an explosive nature were eliminated and subsequently ignited. The season of the year would require the front door closed, and, under these circumstances, a very moderate sudden expansion of the atmosphere of the store would force out the bulk windows easily. The case is worth a chemical inquiry.

NATIONAL ACADEMY OF SCIENCES.—One of the last Acts of the Thirty-seventh Congress, was the incorporation of a body under the title of the "National Academy of Sciences." The following is a copy of the Act:—
viz.

"Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled, That Louis Agassiz,

Massachusetts; J. H. Alexander, Maryland; S. Alexander, New Jersey; A. D. Bache, at large; F. A. B. Barnard, at large; J. G. Barnard, U. S. Army, Massachusetts; W. H. C. Bartlett, U. S. Military Academy, Missouri; U. A. Boyden, Massachusetts; Alexis Caswell, Rhode Island; Wm. Chauvenet, Missouri; J. H. C. Coffin, U. S. Naval Academy, Maine; J. A. Dahlgren, U. S. Navy, Pennsylvania; J. D. Dana, Connecticut; Charles H. Davis, U. S. Navy, Massachusetts; George Engleman, St. Louis, Mo.; J. F. Frazer, Pennsylvania, Wolcott Gibbs, New York; J. M. Gillis, U. S. Naval Observatory, Kentucky; A. A. Gould, Massachusetts; B. A. Gould, Massachusetts; Asa Gray, Massachusetts; A. Guyot, New Jersey; James Hall, New York; Joseph Henry, at large; J. E. Hilgard, at large, Illinois; Edward Hitchcock, Massachusetts; J. S. Hubbard, U. S. Naval Observatory, Connecticut; A. A. Humphreys, U. S. Army, Pennsylvania; J. L. Le Conte, U. S. Army, Pennsylvania; J. Leidy, Pennsylvania; J. P. Lesley, Pennsylvania; M. F. Longstreth, Pennsylvania; D. H. Mahan, U. S. Military Academy, Virginia; J. S. Newberry, Ohio; H. A. Newton, Connecticut; Benjamin Pierce, Massachusetts; John Rodgers, U. S. Navy, Indiana; Fairman Rogers, Pennsylvania; R. E. Rogers, Pennsylvania; W. B. Rogers, Massachusetts; L. M. Rutherford, New York; Joseph Saxton, at large; Benjamin Silliman, Connecticut; Benjamin Silliman, Jr., Connecticut; Theodore Strong, New Jersey; John Torrey, New York; J. G. Totten, U. S. Army, Connecticut; Joseph Winlock, U. S. Nautical Almanac, Kentucky; Jeffries Wyman, Massachusetts; J. D. Whitney, California, their associates and successors, duly chosen, are hereby incorporated, constituted and declared to be a body corporate by the name of the 'National Academy of Sciences.'

"SEC. 2. *And be it further enacted*, That the National Academy of Sciences shall consist of not more than fifty ordinary members, and the said corporation, hereby constituted, shall have power to make its own organization, including its Constitution, by-laws, and rules and regulations; to fill all vacancies created by death, resignation, or otherwise; to provide for the election of foreign and domestic members, the division into classes, and all other matters useful or usual in such institutions, and to report the same to Congress.

"SEC. 3. *And be it further enacted*, That the National Academy of Sciences shall hold an annual meeting at such place in the United States as may be designated, and the Academy shall, whenever called upon by any Department of the Government, investigate, examine, experiment, and report upon any subject of science or art, the actual expense of such investigations, examinations, experiments and reports, to be paid from appropriations which may be made for the purpose, but the Academy shall receive no compensation for any services to the Government of the United States."

According to the Druggist's Circular, June, 1863, the first meeting of this body was held in the Chapel of the University of New York, on the 22d of April, 1863. The Hon. Henry Wilson, of Massachusetts, (through whose exertions mainly the bill was passed,) called the meeting to order in a brief but pertinent address. Prof. Joseph Henry, of Washington, was elected *pro-tem*. President of the meeting, and Prof. Caswell, of Providence, Secretary. The meeting then passed the following resolution:

"*Resolved*, That the Academy accept the Act of Incorporation, and hereby declares its intention of entering with earnestness and devotion upon the high course marked out for it by Congress."

The plan of organization adopted was in the main, as follows:

1. The class of Mathematics and Physics.

2. The class of Natural History.

The corporate members elect under which of these two classes, and in which section of that class, they will inscribe their names. The classes are subdivided thus:

A. CLASS OF MATHEMATICS AND PHYSICS.—Sections 1. Mathematics; 2. Physics; 3. Astronomy, Geography, and Geodesy; 4. Mechanics; 5. Chemistry.

B. CLASS OF NATURAL HISTORY.—Sections 1. Mineralogy and Geology; 2. Zoology; 3. Botany; 4. Anatomy and Physiology; 5. Ethnology.

While each member chooses his own position, he may also be elected an honorary member of any section by the members thereof, and the Academy retains the power of transferring a member from one section to another.

There may be fifty foreign associates who take no part in the business of the Academy, but have the privilege of attending its sessions, reading and communicating papers, and of receiving a copy of the publications of the Academy.

The officers of the Academy are a President, a Vice-President, a Foreign Secretary, a Home Secretary, and a Treasurer, all of whom are elected for a term of six years.

There is also a Chairman and Secretary to each class, elected annually at each January meeting. The officers of the Academy, and Chairman of the classes, together with four members to be annually elected by the Academy, constitute a Council for the transaction of such business as is assigned to them by law or by the Academy.

The powers of the President, (or, in case of his absence or disability, the Vice-President,) are to preside at the meetings of the Academy, name (unless otherwise provided by law) Committees of members, referring business, experimental inquiries, investigations or preliminary inquiries required by the Government of the United States or its branches, to members specially conversant with the subject; and, with the council, to direct the general business of the Academy. The duties of the other officers present nothing beyond what is usual in all similar organizations.

The Academy holds two stated meetings in each year—one in January and one in August. The January meeting is to be held always in Washington, on the third day of January, (or when that day is a Sunday, on the 4th;) but the August meeting will be held at such place as the Academy at any previous meeting may designate, and on the third Wednesday of the month. The scientific meetings of the Academy are to be open or public, the business meetings closed. Communications by persons not members of the Academy are to be presented and read by a member, who makes himself responsible only for the general propriety of the paper, and not for opinions expressed by the author.

Propositions for researches, experiments, observations, investigations, or reports, shall originate with the classes to which the subjects are appropriate, and then to be submitted to the Academy for discussion, and approval or rejection, excepting propositions from the Government of the United States, or any of its branches, which shall be acted on by the President, who will, in all such cases, report, if necessary, at once to the Government, and also to the Academy at the next stated meeting. The judgment of the Academy is to be at all times at the disposition of the Government upon any matter of science or art within the limits of the

subjects embraced by it. The President of the Academy is competent, in special cases, to call in the aid, upon committees, of experts, or men of remarkable attainments not members of the Academy.

The annual report to be presented to both Houses of Congress is to be prepared by the President of the Academy, and before its presentation is to be submitted, first to the Council, and then to the Academy, at the January meeting. The abstract of a memoir may be sent by any member to the Home Secretary, to be printed and circulated among the members during the recess of the Academy.

These are the most important features of the organic law of the National Academy of Science. An election was held under the rules, when the following officers were chosen almost unanimously :

President—Alexander Dallas Bache, Washington, D. C.

Vice-President—James D. Dana, New Haven, Conn.

Foreign Secretary—Louis Agassiz, Cambridge, Mass.

Home Secretary—Wolcott Gibbs, New York,

Treasurer—Fairman Rogers, Philadelphia, Penn.

OFFICERS OF THE CLASSES.

Class A, Mathematics and Physics—Chairman, B. Pierce, Cambridge, Mass.; Secretary, B. A. Gould, Cambridge, Mass.

Class B, Natural History—Chairman, B. Silliman, New Haven, Conn.; Secretary, J. S. Newberry, Ohio.

Representatives in Council—Admiral C. H. Davis, Lewis M. Rutherford, Dr. John Torrey, Prof. J. P. Lesley.

After the completion of the organization, each member present, agreeably to the requirements of the organic law, took the oath of allegiance prescribed by the Senate of the United States for its own members, and in addition thereto took an oath faithfully to discharge the duties of a member of the National Academy of Sciences to the best of his ability.

The President then read a letter from the Secretary of the Treasury, asking the Academy to prepare a report on the subject of Weights, Measures, and Coinage, both domestic and international. A resolution of thanks to Chancellor Ferris, for the use of the rooms in the University Building, was passed unanimously, and the Academy adjourned to meet in the city of Washington on the 3d day of January, 1864.

LA SOCIEDAD DE FARMACIA, NACIONAL ARGENTINA. ARGENTINE PHARMACEUTICAL SOCIETY.—By a letter to the Editor, dated Buenos Ayres, April 26th, from Mr. Charles Murray, Secretary of the Pharmaceutical Society at that place, we learn that the name of that Institution has been changed to that of "Argentine Pharmaceutical Society" in consequence of its having recently been nationalized by the President of the Republic. After some remarks relative to personal matters, the author observes as follows :

"I am happy to see that your Society has the same object in view as ours, that is to say, to make Pharmacy what it ought to be, and what it is in France. Although Buenos Ayres is not much known, it has, nevertheless,

highly progressive ideas, especially in relation to the learned professions. A physician has to study six years, besides being a B. A. of our University; and a *Pharmacien* (I use this word advisedly) besides being a B. A., has to study two-years Chemistry, one year Physics, and one of *Materia Medica*. I have lately presented a project of an *Ecole de Pharmacie* to our Society, which has been approved of, and we have presented it to the national government. We are pretty sure of it being approved of, as the Minister of the Interior says he will do all in his power to forward it.

In this project we demand for the candidate who presents himself for examination, to furnish proofs of having passed examinations in two years of Latin, two years of Mathematics, one of Physics, two of Chemistry, one of Natural History applied to Pharmacy, and one of Pharmacology. If he passes the two general examinations, we deliver to him the diploma of Licentiate in Pharmacy. Bye-and-bye I intend to demand the Doctorate for those who are willing to try for it, after having received their diploma of Licentiate, and I hope it will be given to us, as I believe we have just as good a right to the title of doctor as the M. D.'s."

By the same conveyance was received the April number of "*Revista Farmaceutica*," and two copies of "*Reglamento de la Sociedad de Farmacia Nacional Argentina*."

A Practical Hand-book of Medical Chemistry. By John E. Bowman, F.C.S., former Professor of Practical Chemistry in King's College, London. Edited by Charles L. Bloxham. Third American, from the fourth and revised London Edition, with illustrations. Philadelphia. Blanchard & Lea. 1863. pp. 351. Duodecimo.

The publishers have done good service to the medical profession in bringing out this new American edition, so soon after the fourth and much improved English. In fact, seven years had elapsed since the previous revision in England, in which period many improvements and discoveries have been made, which will be here found. The author has confined the work to subjects of practical utility and professional interest most needed in the practice of medicine. The chemistry of the blood, urine, bile, and other animal fluids, occupy the chief part of the book, which concludes with the detection of poisons in organic mixtures, in which the new process of *dialysis* is practically applied. The novelty of this process induces us to give a place to the chapter as a sample of the editor's style, as well as for its merit.

Separation of Poisons from Organic Mixtures by Dialysis.

The important observation made by Mr. Graham that crystallizable bodies will pass in a state of solution through membranous and other diaphragms which will not permit the passage of the amorphous substances composing the bulk of most organic mixtures, has been applied by him to the separation of poisons. As the process is very simple, easy

of execution, and does not involve any operations, which would interfere with the subsequent application to the same mixture of any other process for the separation of the poison, it will probably come into very general use in medico-legal investigations.

This process is, indeed, a refined filtration, and is applicable instead of that operation, in all the steps of the separation of poisons from organic mixtures, with this very great advantage, that it removes not only substances mechanically suspended in the liquid, as is the case with filtration, but also coloring matters, albuminous substances, &c., which so interfere with the application of tests to the liquid obtained by filtration.



A circular piece of parchment-paper* is folded, as in preparing a filter, into a cone, which should be at least twice as large as is necessary to contain the mixture under examination. This cone is placed in the mouth of a cylindrical jar (see Fig.), (a beaker or common tumbler), filled nearly to the brim with water, the volume of which should be about eight times that of the organic mixture.

The solid portion of the organic matter having been cut up, and, if it be thought necessary, a little water having added to thin the mixture, it may be poured at once upon the cone of parchment-paper arranged as above directed. The whole may then be covered with a bell-glass, or placed in a secure cupboard, and left for as long a period as can be conveniently allowed to elapse, if possible, for at least forty-eight hours.

The *diffusate*, as the liquid in the glass is termed, may then be evaporated to a small bulk and examined for the poison by the appropriate methods. whilst the organic mixture remaining upon the cone or *dialyser* may be subjected to the ordinary processes for the separation of poison from organic matter.

Of course, in cases where there is reason to suspect the presence of hydrocyanic acid, alcohol, or phosphorus, it would not be prudent to subject the mixture to dialysis until at least a portion of it had been examined for those poisons.

If time could be spared, it would evidently be desirable to dialyse the organic mixture at first without any addition (except water), since not only would all questions of impurity in the reagents be avoided, but a knowledge of the state of the poison, whether soluble or not, would be thus gained, which might, in many cases, prove of great service. The mixture might then be dialysed a second time after digestion with the proper solvent, such as hydrochloric acid, or that acid with the addition of chlorate of potash.†

* This should have been well soaked in distilled water, and dried before use.

† The Editor has obtained most satisfactory results by this process in separating arsenious acid, strychnine, morphine, opium, and oxalic acid (as oxalate of lime). The arsenious acid was separated in some cases by simply dialysing the organic mixture, in others by digesting with hydrochloric acid and dialysing, and in others by first digesting with hydrochloric acid and chlorate of potash. In all cases the diffusate was colorless.

THE
AMERICAN JOURNAL OF PHARMACY.

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SEPTEMBER, 1863.  
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ASSAY OF OPIUM AND ITS PREPARATIONS.

BY FERDINAND F. MAYER.

Owing to the appearance of several new Pharmacopœias, our own among the number, the present may be considered an opportune moment for the publication of a strictly volumetric method by which the relative therapeutical and commercial value of this drug can be determined, so far as the same depends on its percentage of morphia, which on the whole may be considered a just criterion.

The method which I propose, after a twelve-month's experience with it, embraces many leading points of the assays from time to time recommended by members of our profession, and, as do all the others, turns upon the ultimate elimination of the morphia out of the complex material represented in this vegetable juice. I believe that it will be found accurate in its details, and practicable, even with a limited amount of means, scientific as well as mechanical, being essentially simple in its manipulations, and requiring much less time than is ordinarily consumed for the purpose.

The main principle of the assay, is the titration of the alkaloids by a graduated test liquor, a solution of mercuric chloride in an excess of iodide of potassium, which I proposed for the purpose at the last meeting of the American Pharmaceutical Association, (Proceedings for 1862), and the application of which generally, and in particular in the case of two other

important narcotics I gave in the January, 1863, number of this Journal.*

The point next in importance is the separation of the morphia from the accompanying alkaloids. Here I have made use of the solubility of this base in solutions of fixed alkalies, the discovery of which is severally claimed by Robinet, Thiboumery, and Pelletier, and which Couërbe introduced into the assay afterwards adopted by F. Mohr.

Couërbe and Mohr employ caustic lime as the solvent, and boiling heat to bring about the solution, and this method is known to furnish the alkaloid in the purest condition. The objections to it are, that it necessitates too much evaporation, and that a considerable quantity of the alkaloid escapes precipitation, or, is rendered non-precipitable by ammonia.

The cause of the first of these objections is the solubility of morphia in solutions of salts of ammonia, and in an excess of caustic ammonia, and that of the last named is the action of all alkalies, ammonia not excepted, on this and other alkaloids, in the course of time or when aided by heat. The solubility of morphia in salts of ammonia has been turned to account by O'Shaughnessy in his assay of opium, and the same principle has lately again been recommended by Haines. While it is a source of loss in Mohr's process, it is altogether inapplicable for the accurate separation of narcotina from morphia, as used by

* It appears from the report of Mr. E. Baudrimont on prize essays, rendered to the Société de Pharmacie, Paris, November 12, 1862, (*Journal de Pharmacie*, xliii p. 49) that a thesis treating on the qualitative and quantitative testing of alkaloids, and which received the prize of that year, was entered on July 22 last by Mr. Alfred Valser, in which he makes use of the same reagent for the same purpose. I cannot judge of the full merits of Valser's paper, not being as yet in possession of it, and because its quantitative portion is entirely passed over in Fresenius' *Zeitschrift für anal. Chemie* (ii p. 78), and I refrain, therefore, from referring to certain points mentioned in the above places, which are at variance with my own observations and those of Planta, Boedeker, Delfs, Nessler and Groves, none of which authors have been consulted. The suggestion to apply the reaction is Groves', as I have pointed out in my original paper. Otherwise, Mr. Valser's thesis is dated fully a month prior to the last meeting of the American Pharmaceutical Association, though made public only some months after.

O'Shaughnessy and Haines, for the reason which was pointed out by Fordos, that narcotina also dissolves in salts of ammonia, and since in fact all other solid alkaloids expel ammonia from its salts, the sesqui-carbonate excepted.

There can be no doubt as to the solubility of morphia in caustic and carbonated ammonia; according to Donné 1 part of morphia requires 110 parts of liquid ammonia, (spec. gr. ?) and according to Duflos, 117 parts (spec. gr.=.96) for solution. Such a solution rapidly turns brown in the air, a resinous substance being formed, which is separated by the addition of acids, and this at the expense of the alkaloid, as has been shown by Reveil, with the formation of meconic acid, as stated by Guibourt, (*Journ. de Pharm.* xli. p. 115). I have satisfied myself that more than a slight excess of ammonia, which may eventually be vaporized by exposure of the solution in an open vessel, acts injuriously by preventing deposition to a considerable extent, and I believe that the accuracy of the results obtained by precipitation according to Merck and Dr. E. R. Squibb, are due to this consideration, besides to a proper concentration of the liquid.

The fixed alkali which I employ is crystallized baryta, prepared according to F. Mohr's process, and sufficiently pure when merely drained on a covered glass-funnel. It has this advantage over all others—that it can be used in the solid form, and that at the same time the degree to which the liquid is to be rendered alkaline is perfectly under the control of the operator; that it dissolves largely in watery fluids, and that its own aqueous solution dissolves morphia quite largely at ordinary temperatures,—100 cubic-centimeters 2.5 grammes and upwards. The opium-alkaloids soluble in water are likewise dissolved by this alkali, while narcotina and thebaina, and all others, are entirely insoluble in it, unless heat be applied or their contact be prolonged for a day, which is much beyond the time required in the assay.

From a solution of equal parts of morphia, codeïa and narcotina in very dilute sulphuric acid, shaken with a considerable excess of crystallized caustic baryta, every particle of the two first named alkaloids passes again into solution. When the flask containing the mixture be heated to short of the boiling

point, nearly half of the narcotina will be dissolved likewise, and there is a partial decomposition of this alkaloid; after remaining together for some eight hours at a summer-temperature, on being filtered the acidulated filtrate requires an excess over the calculated amount of iodohydrargyrate. Thebaina shows precisely the same behaviour.

I consider the use of this alkali, therefore, as the most convenient method for the separation of morphia and the soluble alkaloids from narcotina and its kind. From an aqueous solution of opium, it removes besides, in great portion, those substances which interfere with the deposition of morphia, and which had not before been removed by water. Saturated with the soluble alkaloids of opium it deposits them in part on being partly saturated with acids; slightly supersaturated with moderately dilute sulphuric acid and then boiled with or passed through animal charcoal without much dilution, such a solution at once precipitates the morphia in a pure condition by the careful addition of ammonia and with some stirring. It is sufficient for an accurate assay, to supersaturate the barytic solution with hydrochloric acid, and to precipitate the morphia then by ammonia.

Washing the precipitated alkaloids of opium is generally a profitless operation. Guibourt is of the opinion that part of the morphia, especially when ammonia be used too sparingly, is in the form of submeconate; whether or not this be the case, the impure alkaloid is quite soluble in water, and prolonged washing may therefore cause considerable discrepancies in the results. I believe that it will be found more correct to wash only as long as the liquors acidulated with nitric acid indicate the presence of chlorine from adhering mother-water.

The mother-liquor from which, after one inspissation, the remainder of crystallizable alkaloid has been recovered, may, after filtration, be used to determine approximately the amount of morphia by subtracting its equivalent in cubic centimeters or grains of sol. iodohydr. from that required by the quantity of liquid from which the morphia was precipitated, and this again is ascertained from a small portion of the barytic solution; the residual assay, however, is only approximative, as it is but rarely that the numbers show perfect agreement.

As before remarked, much depends upon a proper concentra-

tion of the solution, and this again is closely dependant upon the quantity of opium taken to assay. It is impossible to exhaust by any known means the extract of even so small a quantity as 5 grammes of opium (80 grains) with less than 75 cc. of water; but the solution so obtained is too weak to allow more than a fraction of the morphia to be precipitated.

A solution from which the morphia is to be speedily deposited after the addition of ammonia, must hold at least one per centum of the alkaloid; only about one-ninth then remains in the liquor; in pure solutions none whatever.

I have found it best to use opium in substance, 15 grammes or half a troy ounce, and 100 cubic centimeters, or three fluid ounces, as the bulk of the solution. Since the amount of morphia in such a quantity would rarely exceed two grammes, it is the proper bulk for a solution to be saturated with baryta.

In order to exhaust opium or its preparations, it is necessary to employ hot acidulated alcohol, varying in strength with the amount of moisture in the substance. Below will be found three assays of the same powdered opium, extracted under different circumstances, and all performed in a satisfactory manner, which may illustrate the comparative value of the different menstrua and quantities.

The quantity of alcohol should not be less than that used by Merck, 24 parts, but in several more fractions.

This extract after the evaporation of alcohol and reduction to about five cubic centimeters is mixed with cold water, the vessel being at the same time cooled from without. The advantages gained by this portion of Gregory's process are very great, and in ordinary cases render further purification unnecessary. The watery solution and the washings of the black resinous precipitate with hot water, must then make up 100 cc. or three fluidounces.

Aqueous extracts of opium are redissolved in alcohol of 85 p. c., and then treated in the same manner as the above. In some cases, as in examining inspissated mother-liquors, precipitation with acetate of lead becomes necessary, as otherwise the baryta precipitate would be too bulky; of this an example is given below.

The addition of caustic baryta to the acidulous watery ex-

tract causes precipitation of acids and bases, and a magma forms at first which grows thinner by degrees. This precipitate leaves but a very small volume on drying, corresponding to the quantity of baryta that has been added. The increase in bulk of the mixture is almost entirely, within 0.5 cc., due to this precipitate. It may therefore be considered altogether unnecessary to make any reduction for this minute degree of dilution.

That there exist certain fixed relations, and some mutual dependence between the various ingredients of opium, may in part be gathered from the assays communicated below. I have, however, thought it best to leave such inferences to future consideration, since they might lead to the adoption of approximate methods, only useful in the hands of those accustomed to assaying opium, for the purpose of facilitating the operation.

Assay of Morphia and its Salts.

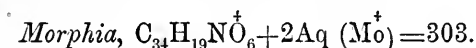
The precipitate which morphia forms with solutions of mercuric chloride, was first noticed by Caillot (Ann. [Chem.] Pharm. ix. 328, (1834), and A. v. Planta describes it as a "yellowish pulverulent precipitate, which soon assumes a gelatinous condition, characteristic for this alkaloid. It is insoluble in hydrochloric acid." (Das Verhalten der Alkaloide, Heidelberg, 1846.) He might have added that it is unusually soluble in water as compared with the precipitates of most other alkaloids, so much so as to render the residual method with silver applicable only under certain restrictions.

It is readily decomposed by a process analogous to that of Liebig and Merck for emetina, and has been analysed by Groves; the formula he has given, $C_{34}H_{19}NO_6$, HgI_2 , must be changed to $C_{34}H_{19}NO_6 HI + HgI$, in accordance with that of the alkaloid precipitates examined by Boedeker (Ann. Chem. Pharm. lxxxiii. 372. Gmelin's Handbook, vol. xiv.) and the compounds precipitated by mercuric chloride and cyanide.

I. A double equivalent of morphia, * $2(C_{34}H_{19}NO_6 + 2Aq.)$ 606,

* The doubling of the equivalent appears advisable not only on account of the more lately adopted formula of the sulphate, but also for greater convenience in calculation, since a single equivalent would represent 1500 cc. of test liquor.

requires for precipitation a small excess over 3000 cubic centimeters of the $\frac{1}{10}$ normal solution of iodohydrargyrate, in the ratio of 50 cc. instead of 49.5 cc., and owing to the same cause, —solubility in water,—the $\frac{1}{5}$ normal troy solution (16.22 grains mercuric chloride, and 60 grains of iodide of potassium in 6000 grains) is too weak to give accurate results; in its place a *normal* solution is to be used, containing 135.5 grains of corrosive sublimate, and 498 of the iodide in 10,000 grains by weight. Of this solution 16 grains are almost exactly equivalent to one cubic centimeter of the decimal solution. I do not think its comparison with a silver solution advisable, as it would be difficult in the hands of those not provided with proper graduates always to obtain the required concentration.



Two grammes of the crystallized alkaloid dissolved in water with the aid of dilute sulphuric acid and diluted to 200 cc. Of this

40 cc. required	20 cc. of sol. iodohydr.
45 cc. "	22.6 cc.
50 cc. "	24.9 cc.
10 cc. "	5.1 cc.
30 cc. "	15.0 cc.
<hr/>	
175 cc. "	87.6 cc.

100 cc. therefore consumed 50.006 cc. sol. iodohydr.

The first precipitation was performed in a 100 cc. flask, which was filled with water up to the mark, and filtered; by pressing the jelly over another filter, 92 cc. of filtrate were obtained. The precipitate itself on drying leaves but a very small bulk of dirty yellow powder.

40 cc. of the filtrate, mixed with carbonate of lime and neutral chromate of potassa,

required 21.3 cc. of $\frac{1}{10}$ normal solution of silver.

40 cc. "	21.5 cc.	"	"	"
10 cc. "	5.4 cc.	"	"	"
<hr/>				
90 cc. "	48.2 cc.	"	"	"
or 100 cc. "	53.8 cc.	"	"	"

As the 100 cc. represent 40 cc. of a solution of morphia = 0.4 grammes, and 20 cc. sol. iodohydr., equal to 80 cc. sol. silver, of which latter only 53.8 reappear in the filtrate, an amount of iodine equivalent to the silver contained in 26.2 cc. of sol. silver has combined with 0.4 grammes of morphia.

One gramme of morphia in being precipitated with 50 cc. of sol. iodohydr., therefore, combines with iodine, equivalent to 65.4 cc. of sol. silver.

According to the formula, $2(\text{Mo}^+\text{HI} + \text{HgI})$, 49.5 cc. of sol. iodohydr. equal to 198 cc. sol. silver lose one-third, = 66.12 cc. sol. silver, and retain two-thirds, = 132 cc. sol. silver, of iodine and chlorine.

A loss of 66.12 cc. sol. silver from the four-fold number of cc. sol. iodohydrar. used is therefore equivalent to one gramme of morphia, expressed by the formula $\frac{4n \text{Hg} - n \text{Ag}}{66.12} = x$ grammes

Mo ; $n \text{Hg}$ = the number of cc. sol. iodohydr.; $n \text{Ag}$ = that of cc. sol. silver required to completely precipitate the filtrate.

The amount of silver solution increases, however, with the dilution of the filtrate from the precipitate, and this residual method becomes inaccurate when the morphia precipitated is less than 0.3 grammes to 100 cc. of filtrate. While, therefore, it is useful in determining the composition of the precipitate, we cannot conveniently rely on it in the assay of opium.

II. Five grains of crystallized morphia require for complete precipitation 257 grains of normal troy solution of iodohydrargyrate. Ten grains of the latter are equal to 0.233 of a grain of morphia.

Sulphate of Morphia. $2(\text{C}_{34} \text{H}_{19} \text{NO}_6, \text{SO}_3 \text{HO}) + 10 \text{HO} = 758$.

One gramme of sulphate of morphia requires for precipitation 40 cc. (resp. 39.58 cc.) of sol. iodohydr.

One gramme of it combines with iodine equal to 53.11 cc. sol. silver, which leads to the formula $\frac{4n \text{Hg} - n \text{Ag}}{53.11} = x$ grammes sulphate of morphia.

Five grains of sulphate of morphia dissolved in one fluidounce of water consumes 208 grains of normal Troy solution; 10 grains of the latter therefore represent 0.244 of a grain of the salt.

Liquor Morphiæ Sulphatis. U. S. Ph.

Two fluidounces containing two grains of sulphate of morphia

require for precipitation, according to temperature, from 90 to 100 grains of normal Troy solution.

20 minims of *Liquor Morphiæ Sulphatis* U. S. Ph. mixed with one fluid ounce of water produces neither cloudiness nor a precipitate on the addition of 20 minims of normal Troy solution of iodohydrargyrate.

Magendie's Solution of Sulphate of Morphia (16 grs. per fluid-ounce.)

One fluidrachm mixed with the mercuric solution congeals into a semi-solid mass; it is necessary to dilute this solution.

One fluidrachm mixed with two fluidrachms of water requires for precipitation 83 grains of normal Troy solution.

Twenty minims of Magendie's solution mixed with one fluid-ounce of water produces a thin, semi-transparent jelly, on the addition of 20 minims of normal Troy solution of iodohydrargyrate.

Acetate of Morphia $2(\text{C}_{34} \text{H}_{19} \text{NO}_6, \text{C}_4 \text{H}_4 \text{O}_4) = 690.$

One gramme in 100 cc. of water consumes 44 cc. (resp. 43.48 cc.) of $\frac{1}{10}$ normal solution of iodohydrargyrate. It combines with iodine equal to 57.77 cc. of sol. silver; therefore $\frac{4n \text{ Hg} - n \text{ Ag}}{57.77} = x$ grammes acetate of morphia.

Five grains require 217 grains of normal Troy solution; 10 grains of the latter are equal to 0.234 of a grain of acetate of morphia.

Hydrochlorate of Morphia. $2(\text{C}_{34} \text{H}_{19} \text{NO}_6, \text{HCl} + 6 \text{ Aq.}) = 751.$

One gramme dissolved to 100 cc. requires 40.5 cc. (resp. 39.9 cc. by calculation) of sol. iodohydrargyrate, and for the chlorine contained in it 26.6 cc. of sol. silver. It combines with iodine equivalent to 79.8 cc. of sol. silver. 5 grains of the hydrochlorate dissolved in two fluidounces of water consume for precipitation 207 grains of normal Troy solution of iodohydrargyrate.

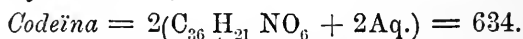
Narcotina $\text{C}_{46} \text{H}_{25} \text{NO}_{14} = 427.$

The precipitate is pale yellow, and curdy, and becomes pulverulent after a time; it dissolves but with difficulty in water even at the boiling point; the portion remaining undissolved fuses into resinous globules which float on the surface; on

cooling, that which had dissolved is again completely precipitated.

One gramme of narcotina dissolved with the aid of a little dilute sulphuric acid to 100 cc., requires for precipitation 46.8 cc. $\frac{1}{10}$ normal solution of iodohydrargyrate. The same quantity combines with one third of the iodine contained in the precipitant equivalent to 46.8 cc. of $\frac{1}{10}$ normal solution of silver; the mercurial precipitate must be removed by filtration, on account of its being acted on by the silver solution.

For the determination of narcotina by apothecaries' weights and measures, the $\frac{1}{5}$ normal Troy solution of iodohydrargyrate is sufficiently accurate.



This alkaloid shows great analogy with morphia in this and other reactions; the precipitate is curdy.

One gramme requires for precipitation 47.32 cc. of $\frac{1}{10}$ normal solution of mercury, and combines with iodine equivalent to 63.1 cc. of sol. silver.

Opium.

I. *Smyrna opium*, of recent importation, contains 17.3 p. c. of water. A preliminary assay was made with 15 grammes, cut into small pieces, which were placed in a 6 ounce beaker and digested in the water bath with 100 cc. of 80 p. c. alcohol and one gramme of oxalic acid, until no more brown lumps appeared in the mass. After allowing to settle, the liquid portion was poured off on a filter and the dregs pressed out with a porcelain spatula, but retained in the beaker. They were again heated with 100 cc. of alcohol of the same strength, and the hot tincture passed through the same filter. The flask with the filtrate from the two infusions was then placed in the water-bath to evaporate, while the exhaustion of the dregs was continued with 30 cc. of alcohol at a time, the same filter being used and the tinctures received in another flask until 350 cc. of alcohol had been used for the purpose. A small quantity of the last filtrate, evaporated and redissolved in hydrochloric acid, showed still distinct traces of alkaloids, but too slight to come into consideration. The washings being likewise evaporated to a small bulk were combined with the first portion, and the whole

reduced to about the bulk of 15 cc. This was then mixed very gradually with 50 cc. of cold water, set aside for two hours, and the liquid which had then become clear, was poured off into a 100 cc. flask, while the resinous precipitate in the flask was repeatedly washed with 10 cc. of hot water at a time until the whole solution measured 100 cc.; the resinous matter was then quite brittle, and contained scarcely a trace of alkaloid.

10 cc. of this solution after cooling consumed 21 cc. sol. iodohydr.

20 cc. " " " 43.5 cc. " "

or the 100 cc. were equal to 215 cc. of sol. iodohydr.

The remaining 70 cc. were then agitated with 8 grammes of caustic baryta, the flask being securely closed by a cork, and the shaking continued as long as the crystals of baryta seemed to disappear. The mixture was then poured on a filter sufficiently large to hold half the bulk of the liquid, and the filtrate received into a flask with a neck wide enough to admit a pipette; the funnel during this operation was loosely covered with a piece of plate-glass.

20 cc. of the barytic solution were supersaturated with strong hydrochloric acid, and diluted with water to 50 cc.; which, measured in two portions, required 30.2 cc. of sol. iodohydr. equal to 151 cc. from the 100 cc. representing the 15 grammes of opium.

II. 15 grammes of the same opium were treated in precisely the same manner. 10 cc. of the acid solution required 22.1 cc. sol. iodohydr., equal to 221 cc. for the 15 grammes.

The remaining 90 cc. were treated with baryta, and gave 72 cc. of filtrate; 18.5 cc. of this, acidulated with hydrochloric acid consumed 27.2 cc. of sol. iodohydr., equal to 147 cc. for the 100 cc. representing 15 grammes of opium.

50 cc. of the barytic solution drawn into a small beaker were supersaturated with strong hydrochloric acid in sufficient quantity to re-dissolve the precipitate at first thrown down by it; it was then again neutralized with strong solution of ammonia added by drops. As soon as the atmosphere over the fluid, after purifying it by blowing, showed a faint reaction on moist turmeric paper, one or two more drops of ammonia were added, and the glass placed aside. The ammonia likewise caused a curdy precipitate which soon settled and gradually

fastened on to the sides and bottom of the vessel; it contained a considerable portion of morphia, but no other alkaloid. When this precipitate had subsided the liquid was repeatedly and briskly stirred with a glass rod, which afterwards remained with it; after standing for 8 hours the morphia had nearly all crystallized out, partly in the form of dark colored warty aggregations, partly as a pale brown powder on top of the resinous precipitate on the bottom. The mother liquor was then carefully filtered into a porcelain capsule, the crystals and the filter once washed with the same water, the filtrate acidulated with hydrochloric acid, and evaporated to a syrupy consistence by means of the water-bath. The residue was treated with 10 cc. of water, which formed a tolerably clear solution, and could be poured off without any loss from the crystalline and resinous deposit. This solution was again slightly supersaturated with ammonia, and left for 8 hours; the second mother-liquor was then passed through the same filter, and the later washings of the first and second precipitate and of the capsule likewise. The filter, washed until it no longer gave off any chlorine, was placed in the beaker with the first precipitate, the funnel rinsed with dilute hydrochloric acid, the second precipitate dissolved in the same acid warm, and the solution added to that of the first in hydrochloric acid, so as to make one solution, which was then poured off, and with the washings diluted to 100 cc.

They required for precipitation 54 cc. of sol. iodohydr., equal to 108 cc. sol. iodohydr. from the 100 cc. representing the 15 grammes of opium.

108 cc. sol. iodohydr. are equal to 2.16 gram. of cryst. morphia.

= 14.39 p. c. of the moist opium,
and

= 17.42 p. c. of the dry opium,

The (221—147=) 74 cc. difference represent the alkaloids insoluble in baryta, which calculated as narcotina would show 1.58 grammes of narcotina, = 10.5 p. c. of the moist opium,
= 12.7 p. c. of the dry opium.

The (147—108=) 39 cc. difference express the amount of non-precipitable alkaloid, viz. codeina, narceina. The mother-liquor from the above precipitate of 2.16 grammes of morphia required 17.4 cc. of sol. iodohydr. instead of 19.5 cc.

III. Half a troy ounce of the same opium was exhausted in the same manner with 12 fluidounces of 80 p. c. alcohol and 15 grains of oxalic acid; the alcoholic extract was diluted to 4 fluidounces, of which

3 fluidrachms required 325 grains of Troy sol.

The remainder was treated with BaO, and of the filtrate

4 fluidrachms acidulated with hydrochloric acid required 293 grains Troy sol.

2 fluidounces of the baryta solution were treated as above for the separation of morphia; the precipitates required 853 grains of Troy sol. iodohydr. or $16\frac{2}{3}$ grains of morphia, equal to 1700 grains of sol. or $33\frac{1}{3}$ grains of morphia in the half ounce of opium.

This is equal to 13.875 p. c. of morphia in the moist opium, and
16.79 p. c. " in the dry opium.

The difference from the results of Nos. I. and II., show in some degree the comparative insecurity of partially weighing and measuring, and in the use of Troy and fluid-measures.

IV. Powdered opium containing 6.4 p. c. of moisture (after being kept in paper for half a year).

15 grammes were exhausted with boiling water acidulated with oxalic acid; the liquid portion strained off, and the dregs repeatedly treated with hot water, until scarcely bitter. Evaporated to dryness the extract was dissolved in alcohol of 85 p. c. and treated as in the above essays.

10 cc. required 16.3 cc. sol. iodohydr. = 163 cc. for 15 grammes of opium.

Of the solution treated with baryta, 50 cc. were used for precipitating the morphia; the alkaloid when separated required 45 cc. of sol. iodohydr., or 90 cc. for 14 grammes of opium = 1.8 grammes = 12 p. c.

10 cc. of the barytic solution acidulated with hydrochloric acid required 14.1 cc. sol. iodohydr. = 141 cc.

V. *The same powdered opium.* 15 grammes treated as was the crude opium in I. and II., with the exception, that the powder was transferred to the filter after the second infusion, and exhausted by displacement with hot alcohol.

10 cc. of the acid solution consumed 16.6 cc. After treatment with baryta, 10 cc. required 13.4 cc. of sol. iodohydr.

The morphia precipitated from 50 cc. of the barytic solution, was equal to 49.1 cc.; for 15 grammes therefore 98.2 cc. equal to 19.64 grammes of morphia = 13.09 p. c. of morphia.

VI. *The same powdered opium.* 9.3 grammes treated as the above and brought to an acidulated solution of 51 cc.

5 cc. of the same required 9.7 cc. sol. iodohydr. = 99 cc. for 9.3 grammes.

6.4 cc. of the barytic solution, after being acidulated, consumed 10 cc. sol. iodohydr., equal to 31 cc. from 20 cc. of barytic solution.

20 cc. of the same solution were used for separation of the morphia. The alkaloid by the first precipitation required

19.45 cc. sol. iodohydr.

That by the second from the mother-liquor 2.5 cc. “ “

21.95 cc. “ “

The residual mother-liquor required 9.05 cc. “ “

31.00 cc. “ “

Which is precisely the amount required as indicated by the solution.

21.95 cc. sol. iodohydr. for 20 cc. are equal to 55.97 cc. for 51 cc. or 9.3 grammes of opium = 1.19 grammes morphia = 12.03 p. c.

VII. 15 grammes of the powder were treated as No. V. and found equal to 165 cc. sol. iodohydr.

50 cc. of the barytic solution yielded morphia equal to 45.1 cc. sol. iodohydr.; for 100 cc. or 15 grammes of opium = 1.804 grammes of morphia = 12.03 p. c.

VIII. *Tinctura Opii, U. S. Ph.* (Squibb's Standard).

100 cubic centimeters were treated in the same manner as the alcoholic solutions of I. and II.; the acid aqueous solution was diluted to 75 cc. only. They required, as taken from 10 cc., 84.375 cc. solution iodohydr. Of the baryta solution 40 cc. gave morphia equal to 25 cc. solution iodohydr., or for the 75 cc. of acid solution, or 100 cc. of tincture of opium 46.87 cc. sol. iodohydr. = 0.937 gramme morphia equal to 1.172 gramme of sulphate of morphia = 5.33 grains of sulphate in the fluidounce.

According to this assay the opium = 8.23 grammes in the above 100 cc. of tincture, contained as powder 11.4 p. c. of morphia; it had lost in drying 20.54 p. c.

IX. *Tinctura Opii, U. S. Ph.* (the same as above).

Four fluidounces treated as above with 10 grains of oxalic acid and reduced to 3 fluidounces.

Three fluidrachms required 232 grains Troy sol. iodohydr.

Fourteen fluidrachms of the barytic solution required 518 grains Troy sol. equal to 17.96 grains of morphia in the 4 fluidounces of tincture = 5.6 grains of sulphate of morphia per fluidounce.

X. *Tinctura Opii Deodorata, U. S. Ph., 1860.*

20 cc. of the tincture evaporated and dissolved with dilute acid required 17.5 cc. sol. iodohydrargyr., equal to 87.5 cc. from 100 cc. of tincture.

100 cc. of tincture were reduced to 75 cc. of aqueous solution. Treated with baryta the morphia from 40 cc. required 30.5 cc. sol. iodohydrarg. equal to 57.2 cc. from 75 cc. of solution, resp. 100 cc. of tincture, = 1.144 grammes of morphia to $17\frac{2}{3}$ grains = $22\frac{1}{6}$ grains of sulphate of morphia = $6\frac{1}{2}$ grains of sulphate per fluidounce.

XI. *Vinum Opii, U. S. Ph.*

75 cc. with oxalic acid treated as were the above tinctures, and brought to 75 cc. of acid solution, which was in 10 cc. equal to 12.3 cc., in 75 cc. equal to 92.25 cc. of sol. iodohydr.

40 cc. of the barytic solution required for the morphia precipitated from it 29 cc. sol. iodohydr., or 54 cc. for the 75 cc. of Vinum = 1.086 grammes of morphia.

The 9.88 grammes of opium in the above quantity had a percentage of 10.99.

XII. *Extractum Opii, U. S. Ph.*

10 grammes treated with alcohol of 85 p. c., and 1 gramme of oxalic acid. The watery extract resulting according to the method described above, diluted to 100 cc. was equal to 205 cc. sol. iodohydr.

50 cc. of the barytic solution precipitated morphia to the amount of 64 cc. sol. iodohydr. = 1.28 grammes or 2.56

grammes in 10 grammes of extract, equal to 25.6 p. c. of morphia in the extract.

XIII. *The opium employed for the above extract.*

Eight ounces had yielded $3\frac{1}{2}$ ounces of the above extract; the opium contained 19 p. c. of moisture.

15 grammes were treated as before mentioned to form 100 cc. of aqueous solution.

20 cc. of the latter required 31.2 cc. of sol. iodohydrargyr., equal to 156 cc. for the 15 grammes of opium.

Treated with baryta, the morphia from 50 cc. of the baryta solution required 45.5 cc. of sol. iodohydr., equal to 91 cc. for 15 grammes of opium = 1.82 grammes of morphia = 12.13 p. c. of moist = 14.97 p. c. of dry opium.

Eight ounces of opium contained 465 grains of morphia.

$3\frac{1}{2}$ ounces of extract contain 431 grains of morphia.

XIV. *Soluble extract*, supposed to be an inspissated mother-liquor. It was found necessary to precipitate the solution of this extract with acetate of lead previous to the treatment with baryta. This mode of thinning the fluid was resorted to after it had been proved by experiment that the lead precipitate in acetous solution carries down none of the alkaloids.

2 grammes of the extract diluted to 100 cc. with oxalic acid and water required for precipitation 25.75 cc. sol. iodohydr. = 257 cc. for 20 grms. 20 grammes of the extract were diluted with acetic acid and water to about 100 cc. and then precipitated by 50 cc. of a cold solution of acetate of lead. The mixture was poured on a filter, and 100 cc. of filtrate drawn off, which from the indications of 10 cc. would have required 165 cc. sol. iodohydr. The 100 cc. therefore represent $\frac{165}{257}$ of the 20 grammes of extract.

Treated with baryta, 50 cc. yield morphia equivalent to 32.5 cc. sol. iodohydr.; the 100 cc. therefore equal to 65 cc. = 1.3 grammes of morphia, and according to the proportion $165 : 1.3 : : 257 : x = 2.93$ grammes is the amount of morphia in the extract = 10.15 p. c.

In the above the outlines are given for all kinds of assay which may be required of opium and its preparations.

As there are other alkaloids in opium of which here no men-

tion has been made, I shall continue researches in that direction.

The alkaloids of other Papaveraceæ, sanguinarina (chele-rythrina) and chelidonina, may be likewise drawn into the number which may be determined by this alkaloimetric method.

One gramme of *Sulphate of Sanguinarina* requires 41.66 cc. sol. iodohydr. One gramme of *Chelidonina* requires 54.49 cc. sol. iodohydr.

The colored derivatives of Anilina, resembling the colored alkaloids of Sanguinaria, Glaucium, Escholtzia, etc., in many properties, share with them also this precipitability by iodide of mercury. Though not strictly of pharmaceutical interest, I may mention that I have established an assay for Rosanilina in coloring mixtures and preparations, founded on its precipitation by iodide of mercury from acidulated solutions, while the blue pigment is affected only after a considerable length of time.

New York, August, 1863.

REVIEW OF THE UNITED STATES PHARMACOPŒIA. OF 1860.

BY ALFRED B. TAYLOR.

Three years have passed between the meeting of the National Convention for revising the Pharmacopœia, and the publication of the Revision: and the finished product of the Convention and its Committee's labors is now before us. If this very unusual delay has been the subject of a natural impatience on the part of many, and the occasion of complaint with some, we think that the nature and extent of the alterations indicated in the work are a full explanation of its late appearance, and will with a majority fully atone for the disappointed expectation of its earlier reception. We learn from the Preface that the Committee of Revision held one hundred and nineteen weekly meetings, performing a large amount of their duties through the agency of sub-committees, working diligently in the interval, who made in the aggregate one hundred and thirty eight written reports.

This simple statement is a tolerably good index of the amount of care and labor bestowed by the Committee upon their work; and we believe it may be confidently said that no previous revi-

sion has elicited so thorough an examination of the entire subject of Pharmacy, or has introduced so extensive and important changes into the Pharmacopœia.*

The Committee were justified therefore we think, in saying (as is done in the Preface) that they "believe they have exercised all due diligence in the performance of their task, and think, considering the multiplicity of the details, the numerous appeals to experiment that were necessary, the differences of opinion among themselves, which gave rise to numerous discussions, and the vigilance required to preserve the unities of the work, that the labor devolved upon them could not have been properly accomplished in less time, due regard being had to their private avocations." (p. xxii.)

And yet notwithstanding all the care and vigilance undoubtedly bestowed by the Committee upon the revision, we have discovered one important error, to which we would wish to call particular attention. The error occurs in the formula for preparing Wine of Ergot (page 356.) While the quantity of Ergot is the same as in the old formula, the resulting product has been inadvertently increased from *one* to *two* pints; thus weakening a preparation (and a very important one) which is too weak already. The correction requiring the smallest amount of change in the printed text is to change "two" troyounces to "four" troyounces and to strike out the word "half" from the directions; so that the formula shall read as follows:

"Take of Ergot, in moderately fine powder, four troyounces;
Sherry Wine a sufficient quantity.

Moisten the powder with a fluidounce of Sherry Wine, pack it in a conical percolator, and gradually pour Sherry Wine upon it until two pints of filtered liquid are obtained."

This should be carefully noted by all who have early copies of the work. The error will be rectified in the main body of the published edition.

The first important change in the new Pharmacopœia to be

* In illustration of this it may be mentioned that of all the formulas in the book (including their accompanying directions) there is only one that stands *verbatim et literatim* as in the old Pharmacopœia of 1850. That one is "Acidum Aceticum Dilutum" on page 69 of the work; and even to this, the note has been altered.

noted is its modification of the system of weights. The only denominations of the former Apothecaries weight now retained are the *troyounce*, and the *grain*; the *troy pound*, the *drachm* and the *scruple* having been abandoned. The pound has been disused from the incongruity of having two differing weights of the same name, and from the constant danger incurred, of confusion and error, arising from the extensive employment by druggists and apothecaries, of the commercial avoirdupois pound. The "scruple" and "drachm" have been dismissed as unnecessary; and we think the "ounce" might advantageously have been included in the same category, in correspondence with a scheme presented in the March No. of this Journal for 1860, vol. xxxii. page 97; a scheme which would have relieved us entirely from the inconveniences of a double or compound metrology. The change made, is, however, we think, a good one, and the danger of confounding the apothecaries "ounce" with the avoirdupois "ounce," whether from inadvertence or design, is to a great measure guarded against by invariably writing the former one "troyounce;" thereby constantly calling attention to the peculiar value indicated. We would respectfully urge upon physicians the great importance and advantage of accustoming themselves as soon as possible to the system of the new Pharmacopœia in this respect.

The natural and proper point at which these reforms of the weights to be used in Pharmacy should have been considered and adopted by the Committee would evidently have been at the very outset of the task, and before the revision of the formulas of the preparations had been entered upon. Unfortunately, however, for the attainment of the most desirable results,—partly from diversities of judgment, and partly from the expectation that the new British Pharmacopœia would be given to the public at an early date,—the subject was postponed until the revision of the preparations had been completed; the consequence of which is that the formulas, without using the terms "drachm" and "scruple," are generally based (quite unnecessarily and sometimes disadvantageously) upon their values.

While there was a very general desire that something should be attempted to simplify the system of weights in medicine, there was by no means so uniform an opinion as to what that

something might be. Of the various projects brought before the consideration of the Committee, one was the avoidance of all weights and measures whatever in the presentation of formulas, by simply substituting abstract "parts;" giving thereby merely ratios or proportions and not quantities. Another was the adoption of what had been publicly announced and received as the British system of their new and forthcoming Pharmacopœia. This was the entire abandonment of the troy scale, and the engrafting of its divisions upon the common avoirdupois scale, by dividing this ounce into 480 parts, to be called grains (its actual or received value being 437.5 grains troy) and giving the new grains, scruples, and drachms, therefore the same relation to the avoirdupois ounce, that the old denominations bore to the troy ounce; thus reducing all their values $\frac{17}{192}$ or about one eleventh. The importance of uniformity between the two national Pharmacopœias was so acknowledged, that a strong effort was made to have the new scheme at once adopted. On the other hand, however, the extreme inconvenience of having the value of the grain disturbed, and the great labor that would be constantly involved in the particular kind of reduction required, formed as powerful an argument against the new system. Another project submitted was the simple adoption of the avoirdupois weights, entirely repudiating the former troy weights. Another not essentially different from this, was the employment of *grains* for estimating all weights, up to avoirdupois pounds, (of 7000 grs.) or up to half pounds, and quarters. And lastly, still another, was that finally adopted as a kind of compromise,—the plan of using only troy ounces and grains, of the old Apothecaries' weight.

We trust, if any further improvement is to be made in this matter, at the next decennial Revision of the Pharmacopœia, that the subject will be considered and digested at the commencement of the work, so that all the formulas may be carefully prepared,—not merely in terms, but quantitatively as well,—upon the adopted system.

We are now in a condition to see that it was a fortunate circumstance that the so-called "British-scheme" of weights was not adopted by the Committee: for we now learn since the completion of our Pharmacopœia, that the "General Council of

Medical Education and Registration" has rejected the plan adopted by the British Pharmacopœia Committee, and has resolved "That the weights used in the British Pharmacopœia, be the Imperial or avoirdupois pound, ounce, and grain; and that the terms 'drachm' and 'ounce,' as designating specific weights, be discontinued." This coincides very nearly with the plan which has been adopted for our Pharmacopœia.

The measures in use are not open to the objections which lay against the troy weights; and accordingly no change has been made in them, excepting that the term "gallon" has been discontinued, the equivalent number of pints being stated in all cases; the "pint," in other words, being accepted as the largest unit of liquid measure. The application of fluid measures is somewhat more restricted than in the former Pharmacopœia; the strong, corrosive mineral acids,—the adhesive fixed oils, &c. being estimated in the present edition, uniformly by weight; a decided improvement on the score of convenience, as well as of accuracy.

The process of displacement has received a degree of consideration and an extension of its application to which its now established and acknowledged value entitle it. Improvements also have been introduced which facilitate the operation, and at the same time render it more uniform and efficient in its results. For these improvements the Revising Committee are largely indebted to Mr. Israel J. Grahame of Baltimore, who presented to the American Pharmaceutical Association at its annual meeting in September, 1858, at Washington, an interesting and valuable paper on "the Process of Percolation or Displacement." In accordance with the views of Mr. Grahame, the substances to be subjected to displacement are directed to be in powder of determined fineness,—varying with the nature of the articles used.

The New Pharmacopœia establishes five grades of fineness for powders, which are ascertained and determined by their capability of passing respectively through sieves having 20, 40, 50, 60, and 80, or more, meshes to the linear inch. These five degrees of fineness are designated (in the same succession) by the terms "coarse," "moderately coarse," "moderately fine," "fine" and "very fine." This topic—the "Fineness of Powders"

—forms the subject of a new paragraph in the *Preliminary Notices*, and is treated of on page 7.

It would perhaps have better insured attention to these distinctions if the Committee had employed purely abstract or arbitrary terms to designate them ; such for example as naming them after their limiting sieves—as “ powder No. 20 ”—“ powder No. 40,” &c. But although the designations adopted are in themselves relative, and would probably convey different impressions to different persons, it must be borne in mind that whenever used in the new Pharmacopœia, they have specific and uniformly defined meanings. Much of the success of the operation of percolation depends upon the proper degree of fineness being attained in the substances to be operated upon ; and the certainty of which can only be arrived at by a reference to an established standard. The Apothecary is earnestly besought therefore to give a faithful attention to this detail, which has been carefully marked by the Committee in all the different formulas where necessary, and which must be considered as embodying their most deliberate and well settled judgment in the matter. Unless these directions are carefully observed, satisfactory or uniform results cannot be expected. Once more, then, let the operator bear in mind that where a “ moderately fine powder,” for example, is directed, he is not to interpret the phrase according to his own judgment, as he would formerly have done, but is to understand it as a technical expression describing a powder which has been actually sieved through meshes of a fineness of fifty to the linear inch.

The word “ Percolation ” is used as a title or heading on page 3 of the *Preliminary Notices*, instead of the word “ Filtration,” as being more accurate and distinctive. Two kinds of percolators are directed to be used, according to the nature of the substance to be operated upon ; namely the conical or funnel-shaped, and the cylindrical. Where the substance is liable to swell on being moistened, as for example Gentian, or Squill, the conical-shaped percolator is preferable. Where the substance is very light and open in its texture, as for example Arnica flowers, or Hops, a considerable compression is required, and in such case, the cylindrical percolator answers best. For many substances it is a matter of indifference which is used.

Wherever either one is to be preferred, it has been designated in the formula. *Glass* percolators have been indicated in all those formulas where iron would be acted upon chemically by the substances employed, except perhaps in the case of *Extractum Conii Fluidum*, where it has been accidentally omitted.

Preference has been given to the process of percolation in all cases where it is applicable; though in a few instances an alternative process by maceration has also been given.

The first Table (given at the end of the work) shows that fifty-five medicinal substances have been introduced into the *Materia Medica*;—forty-two of these being assigned to the primary list, and thirteen to the secondary list. Of these new additions, some of course are to be used directly, as medicinal agents, as for example *Lini Farina*, *Lithiæ Carbonas*, *Spiritus Frumenti*, *Acidum Chromicum*, &c. This last article, *Chromic Acid* is recommended as a valuable escharotic for the destruction of fungi and morbid growths; and also as a useful substitute for Nitrate of Silver in ulcerations of various mucous membranes. Others are to be used in the preparation of medicines, as *Amylic Alcohol*, used in the preparation of Valerianate of Soda which in turn is used in the preparation of Valerianic Acid, and this again in the preparation of Valerianate of Ammonia. While others again, though not possessed of any particular medicinal properties, are, from their extensive use in Pharmacy, very properly introduced,—such as *Canna*, *Lycopodium*, *Saccharum Lactis*, *Vanilla*, &c. Among the articles introduced into the *Materia Medica* list, are some that have previously been officinal. Thus *Phosphorus* was in the list of the Pharmacopœia of 1820; so was *Yeast*, under the name of “*Cerevisiæ Fermentum*,” while *Ferri Sulphuretum* was introduced among the “*Preparations*” in 1830, and dismissed in 1840.

New tests or standards of excellence have been added in several places. Thus Scammony must contain 75 per cent of its peculiar resin. Opium must contain sufficient Morphia to yield at least 7 per cent, by the officinal process for that substance. The Cinchonas, must yield at least two per cent of alkaloids capable of yielding crystallizable salts, &c.

The second Table shows that thirteen of the former primary list of the *Materia Medica*, and as many of the secondary list,

have been dismissed. Of these some have been superseded by others more eligible, and the remainder are seldom or never used. Thus Calamina is replaced by the *Zinci Carbonas Præcipitata*; *Spongia* was formerly used for the preparation of *Spongia Usta*. This preparation has become obsolete since the introduction of the compounds of Iodine. *Sapo Vulgaris* is no longer needed; it was used in only one preparation of the Old Pharmacopœia,—the “*Linimentum Saponis Camphoratum*” or *Opodeldoc*. This has been dismissed as an inconvenient preparation, and as possessing no advantages over the “*Linimentum Saponis*,”* of the present Pharmacopœia. Of the 26 names dismissed from the list, twenty-one have been officinal since 1820; two since 1830; two since 1840; and one since 1850. Two of the substances formerly in the *primary* list of the *Materia Medica* have been transferred to the *secondary* list; as is shown in the sixth table; namely “*Calamus*” and “*Sabbatia*.” On the other hand, we see that eighteen articles have been promoted from the former *secondary* list, to the present *primary* list. In addition to which, the *primary* list is now made to embrace five medicines which were formerly included in the class of “*Preparations*.”

The third Table shows that one hundred and eleven medicines have been added to the class of “*Preparations*” or to those combinations which may be, and most of which should be prepared by the dispensing Apothecary. The Preface gives a very excellent account of the principal changes made in the preparations, and of the reasons therefor. The alphabetical arrangement has been much more consistently carried out than in the preceding editions; the committee very properly classing all similar *preparations* together, rather than the various compounds of the same leading substance; thus placing “*Liquor Iodini Compositus*” under *Liquores*, instead of under *Iodinium*, “*Tinctura Ferri Chloridi*,” under *Tinctura*, instead of under *Ferrum*, &c.

Changes have been made in many of the specific gravities; some of these changes being merely the results of more perfect investigation, while others are the consequences of alterations

* This is the name now given to the “*Tinctura Saponis Camphorata*” of the old Pharmacopœia.

in the strengths of the preparations directed.* It is all-important that physicians should familiarize themselves with these new modifications of strength, and should carefully attend to these differences, in prescribing; and also that apothecaries should at once simultaneously and uniformly adopt the new formulas.

In many of the preparations, the changes are quite unimportant, and were introduced for the purpose of bringing certain products to even measures, or in some other way promoting uniformity with other allied preparations. *Acetum Opii*, for example, formerly contained 73.84 grains of Opium in each fluidounce, and the resulting product was three and a quarter pints. It now contains 75 grains in each fluidounce, which is exactly double the strength of the Tincture of Opium, and the resulting product measures two pints. In like manner, *Tinctura Guaiaci Ammoniata* formerly contained $2\frac{2}{3}$ troyounces of Guaiac in each pint; the resulting product being one and a half pints. It now contains 3 troyounces in each pint, which gives it exactly the same strength as the Tincture of Guaiac, and the product measures two pints.

In some cases, changes were rendered necessary by the adoption of the plan of weighing, instead of measuring the mineral acids. The *diluted* mineral Acids are all made weaker. *Acidum Muriaticum Dilutum*, according to the old formula contained about 2114 grains of muriatic acid in each pint. By the new formula it contains 1920 grains; which is a diminution of strength of about $\frac{1}{11}$. The former product was *nearly*, and is now *exactly* one pint. *Acidum Nitricum Dilutum*, formerly contained about 1479 grains of Nitric Acid in each pint; it now contains 1440; which is a diminution of about $\frac{1}{38}$. The product was formerly about seven fluidounces, and is now one pint.

* Where specific gravities are given the figures are always carried to three places of decimals, corresponding to grains where the 1000 grain bottle is used to determine them. In the old Pharmacopœia, they stopped sometimes with two places; thus, the sp. gr. of Nitric Acid was 1.42. it is now 1.420, not differing in point of fact, but merely carrying out the system. The sp. gr. of Sulphuric Acid was changed from 1.845 to 1.843, this being the strength of the best commercial article, and it being very difficult to procure a stronger acid.

Acidum Sulphuricum Dilutum, contains almost precisely the same weight of Acid in each pint that it did before; the variation being less than one grain; hence the only difference of strength in the two preparations results from the employment of acids differing slightly in strength; the acid required by the old formula having the sp. gr. 1.845, while that required by the new one has the sp. gr. 1.843. In this calculation no allowance has been made for condensation in the old formula, which would slightly increase the difference between the two preparations. The product was formerly about fourteen fluidounces; it is now one pint. *Acidum Sulphuricum Aromaticum* has the proportion of Sulphuric Acid diminished by about $\frac{1}{47}$, although in this formula the finished product has not been reduced to an even measure. *Acidum Nitromuriaticum* has the proportion of Muriatic Acid increased by $\frac{1}{49}$. For all medicinal purposes these changes will of course be imperceptible.

An *Acidum Nitromuriaticum Dilutum* has for the first time been introduced into the Pharmacopœia, as a preparation possessing several advantages over the stronger Acid just above referred to, of which it has just one-fourth the strength, and which it will doubtless, in almost every case beneficially replace. Among the merits of this new preparation may be mentioned, that it is one of more uniform strength; that presenting a larger bulk of water to the chlorine eliminated, it will of course retain in solution a larger proportion of that gas; that it will keep much better; and lastly, that it is much more conveniently dispensed, it being almost impossible so to secure the stronger Acid as to prevent leakage, and consequent damage to clothing or furniture with which it may come in contact. *Acidum Phosphoricum Dilutum* is another new preparation of the present Pharmacopœia; it has been prescribed here considerably, however, having been officinal in the London Pharmacopœia since 1836. An alternative process for preparing it from Glacial Phosphoric acid is given, based upon the results of experiments made by Mr. John M. Maisch for the Committee of Revision, and of which experiments an interesting account may be found in the American Journal of Pharmacy, vol. xxxiii. p. 385.

There are variations, however, in the strength of some of the

preparations which alter the usual doses considerably, and which should be very carefully noted both by the physician and the apothecary. Thus the *Syrupus Ipecacuanhæ* has now given to it double the strength of the former preparation. *Syrupus Rhei* is now fifty per cent. stronger than it was in the old Pharmacopœia. These changes have been long called for and are both of decided advantage. A new formula for *Extractum Valerianæ Fluidum* has been given, the only menstruum used being alcohol; whereby a more satisfactory product is obtained; at the same time the strength of the preparation has been doubled, in conformity with the general rule for Fluid Extracts. *Emplastrum Picis cum Cantharide* has been made weaker, in consequence of frequent complaints that blisters had been produced by its use. It formerly contained one-eighth of its weight of Cerate of Cantharides. It now contains only one-thirteenth. *Spiritus Menthæ Piperitæ*, and *Spiritus Menthæ Viridis* were heretofore inconveniently strong; they contained according to the old formulas, one fluidounce of the respective oils in each nine fluidounces of the spirit. They now contain one fluidounce in each pint. The strength of *Liquor Plumbi Subacetatis Dilutus* has been increased fifty per cent. *Oleum Aetherium* has been reduced in strength one half, by the addition to it of an equal volume of stronger Ether, which addition is made for the purpose of preserving it. In the preparation of *Spiritus Aetheris Compositus*, double the quantity of this oil is used; consequently the preparation is of the same strength as before, though apparently of double strength. *Vinum Rhei* has been slightly increased in strength; the finished product having been changed from eighteen fluidounces to a pint, while the active ingredients remain unchanged in quantity.

We shall have time only to glance at some of the principal innovations, of preparations, or of improved processes introduced in the present edition of the Pharmacopœia. *Bismuthi Subcarbonas*, a new preparation, is recommended as a substitute for the Subnitrate of Bismuth; as it possesses all the efficacy of the last named salt, and has the additional advantage of being antacid. *Bismuthi Subnitrates*, is itself prepared by a new and improved process, the result of much laborious investigation and careful experiment, which have obtained a very satisfactory product. Each

of these two preparations of Bismuth is almost entirely, if not absolutely free from Arsenic. *Ceratum Sabinæ* is prepared by an improved process, which consists, (instead of mixing the powdered Savine with cerate as formerly) in making an ethereal extract of the Savine and mixing this with the resin cerate, whereby a much more efficient and beautiful preparation is obtained. *Ceratum Extracti Cantharidis* is prepared on the same principle as the cerate last named, and is designed as a substitute for the well known *Ceratum Cantharidis*. It is recommended as being more efficient, more cleanly, and a more elegant preparation.

Of the various new solid extracts added to the former series, it may be mentioned that *Extractum Arnice Alcoholicum* has been introduced for the purpose of preparing therefrom Arnica Plaster, which has lately been much used. *Extractum Cannabis Purificatum* is adopted for the purpose of rendering the *Extractum Cannabis* of the Materia Medica list more uniform in strength. It is from this purified extract of hemp, that the *Tinctura Cannabis* (a new preparation) is directed to be made, whereby its uniformity is also better secured.

A criticism is here suggested upon the names given to the *Extractum Cannabis* and to the *Extractum Dulcamaræ*. According to analogy each of these preparations should have the word "*Alcoholicum*" affixed to its title. These two being the only solid *alcoholic* extracts which are not so designated. The former is defined to be an alcoholic extract; the latter is made like *Extractum Colecyntidis Alcoholicum*, and *Extractum Senegæ Alcoholicum*, both of which have the word "*Alcoholicum*" added to their names. All the other solid extracts (not designated as "*Alcoholic*") are aqueous, either wholly, or in part.

The class of "Fluid Extracts," embraces the largest number of additions made to the new Pharmacopœia. There were formerly but five officinal fluid extracts, exclusive of fluid extract of Cubebs and fluid extract of Black Pepper, which are now called Oleoresins; there are now twenty-five, in other words, twenty new ones have been introduced. Of the whole number, fifteen are alcoholic, and ten are saccharine. Two of this latter class, namely, Fluid Extracts of *Bittersweet* and *Uva Ursi* would probably be better preparations if *they* were alcoholic.

All of the fluid extracts except two, are of such strength that each fluidounce exactly represents a troy ounce of the substance from which it is obtained. These two exceptions are *Extractum Cinchonæ Fluidum* and *Extractum Pruni Virginianæ Fluidum*, which are made of only half the equivalent strength, owing to the difficulty of obtaining a satisfactory product, if attempted to be made more concentrated.

The rule may therefore now be regarded as established, that fluid extracts should be made of *equivalent* strength: that is, ounce for ounce, excepting when there is a good reason for variation; and then they should uniformly be half as strong. It would be well if those who frame formulas for new fluid extracts (for there will doubtless be many more officinal hereafter) would conform to this precedent.

Fluid Extracts of *Buchu*, *Cimicifuga*, and *Bittersweet*, have been much used of late years, and are very properly introduced into the Pharmacopœia. If any should doubt the propriety of introducing such potent fluid extracts as those of *Colechicum Root*, *Colechicum Seed*, *Hemlock*, and *Henbane*, it should be considered that they are all in use, and it is much better to have a uniform and established formula for their preparation, than to leave it to the judgment of the apothecary, who may have occasion to make them. In proper hands they will without doubt prove valuable medicines. The fluid extract of *Ergot* is perhaps the best preparation of that valuable drug, as well on account of its permanence of character, as of its activity in practice. The Fluid Extract of Cinchona, though by no means an elegant preparation, (it being necessary always to shake the bottle well before dispensing the extract contained in it,) is still a valuable remedy, containing all the medicinal properties of the Yellow Cinchona in a convenient and concentrated form.

The formula for Fluid Extract of *Rhubarb* has been advantageously modified. In the first part of the process, strong alcohol is used as the solvent, whereby a tincture is obtained that can easily be concentrated without danger from over exposure to heat. The quantity of sugar has been diminished, whereby the extract is rendered more fluid, while there is still enough left to

make the preparation keep well. The aromatics have been omitted, for the convenience of making the "Syrup of Rhubarb." When used in prescriptions, it will be very easy for the prescriber to add such aromatics as he may think agreeable. The aromatics have also been omitted from the Fluid Extract of *Senna*, which is used in making *Fluid Extract of Spigelia and Senna*. The *Fluid Extract of Ipæcacuanha* will be found a very useful preparation for prescription purposes, as well as for preparing the *Syrup of Ipæcacuanha*.

Two preparations of pills have been made officinal, which have long had a considerable reputation; one, the *Pilulæ Aloës et Mastiches*, a useful combination, long known as "Dinner Pills" or "Lady Webster's Pills," and made officinal in the Paris Codex, A. D. 1758, under the title "*Pilulæ Stomachicæ*"; the other, the *Pilulæ Antimonii Compositæ*, which name is given to an old preparation, familiarly known as "Plummer's Pills," or the "Compound Calomel Pills" of the British Pharmacopœia.

We feel inclined here to make a criticism on the quantities in which the pills of the Pharmacopœia are directed. It will be admitted by every Pharmaceutist that the numbers called for by the different formulas, are generally exceedingly inconvenient for division, in their practical preparation. In almost every instance the apothecary is required to make a division of the pill mass into 3 or 5 parts. Of the seventeen "pill" formulas, *one* requires 60 pills; *one* requires 80 pills; *two* require 120 pills; *two* require 180 pills; *one* requires 200 pills; *five* require 240 pills; *one* requires 300 pills, and *four* require 480 pills. It is evident from a mere glance at these numbers, that the value of the troy ounce (and its divisions) has had a controlling influence over them. Had the "grain scheme," urged in the xxxii. vol. of this Journal (p. 102,) and already referred to, been adopted, (the troy scale being entirely ignored, and all weights being computed in *grains* up to the commercial or Avoirdupois *pound*,) there would have been no difficulty in selecting such quantities as would be most convenient to the compounder, and he alone can have any interest in the precise number of pills to be manufactured at one operation. A *rational* system of this

kind would have given us 64 instead of 60; 128 instead of 120; 256 instead of 240; and 512 instead of 480. In short, as recommended in the article alluded to, all the pills of the Pharmacopœia would have been stated in *even* multiples of 24 or of 16, or preferably in only *binary* multiples of these numbers. This may appear to some, a rather trifling matter, but we are satisfied that the practical convenience of such a system, would be found to be by no means trivial.

The two very popular effervescing powders, the "Soda" and the "Seidlitz," have been adopted into the family of legitimate preparations, under the names of *Pulveres Effervescentes*, and of *Pulveres Effervescentes Aperientes*. It is only surprising that they have not been made officinal before this.

Two very characteristic classes, namely, the *Resinæ*, and the *Oleoresinæ* have been added to the preparations. The former class comprises the new and valuable articles of *Resina Jalapæ*, *Resina Podophylli*, and *Resina Scammonii*, which will be found concentrated and convenient remedies. The latter class adds to the Oleoresins of *Cubeb* and of *Black Pepper* (formerly designated as "Fluid Extracts") the new ones of *Capsicum*, *Lupulin* and *Ginger*.

Among the new Syrups added to the list, *Syrupus Lactucarii* may be mentioned as a concentrated and useful preparation of this valuable drug. Physicians should bear in mind that this syrup contains 60 grains of Lactucarium in each fluidounce; and that it is a very different preparation from the one extensively prescribed under the title of "Aubergier's Syrup," which contains only about two grains of Lactucarium in each fluidounce.

By the fourth Table it is seen that thirty-seven of the former preparations have been dismissed from the present Pharmacopœia; some of them being superseded by better preparations, as for example "Ferri Iodidum," which is replaced by "Pilulæ Ferri Iodidi;" or "Ceratum Calaminæ," for which we have a substitute in the "Ceratum Zinci Carbonatis;" others have been dismissed as being inferior to other preparations possessing the same remedial properties; as for example, the "Extractum Aconiti" is entirely replaced by the "Extractum Aconiti Aleo-

holicum;" the "Syrupus Sennæ" possesses no advantage over the "Extractum Senna Fluidum" which for several reasons is a better preparation; and others being discarded as having been found to be of little or no value, which may be said of the great majority of articles dismissed.

The fifth Table presents in one view the changes which have been made in the Latin Official names of many of the substances and preparations still retained. In a few instances, a single name has been adopted, to include two or more names of the old Pharmaopœia; as *Erigeron*, simply, for "Erigeron Heterophyllum" and "Erigeron Philadelphicum:" *Ferrum*, in place of "Ferri Filum" and "Ferri Ramenta:" *Rubus*, in place of "Rubus Trivialis" and "Rubus Villosus." In other cases on the contrary, distinctions have been introduced, not before marked. Thus in the place of the old "Aloe," we now have three distinct varieties of *Aloe*, recognised. Instead of "Aurantii Cortex," we have the *sweet* and the *bitter* Orange, distinguished. In the place of "Sinapis," we have the *white* and the *black* Mustard. The *Cyanurets* have been changed in accordance with the more approved nomenclature into *Cyanides*. It would have added to the uniformity of the terminology if the *Sulphurets* had also become *Sulphides*.

Changes have also been made in many of the English names, which have not been placed in the form of a table. Preferring the abstract to the concrete, the Committee have employed the name in the singular number instead of the plural, whenever it was thought to be allowable: giving us the words *Almond*, *Cubeb*, *Fig*, *Prune*, *Rose*, &c., in place of *Almonds*, *Cubebs*, *Figs*, &c.. In many cases the Latin or technical name of an article has become so familiar, (such as *Arnica*, *Calamus*, *Cinchona*, *Digitalis*, &c.,) that the Committee have done well in naturalizing the name at once as the English one, and thereby dispensing with various uncouth and objectionable designations.

Much confusion and uncertainty have heretofore prevailed in relation to the proper classification and nomenclature of the various solutions, aqueous and alcoholic, required by the Pharmacopœia. The Committee have done much toward giving simpli-

city and uniformity to this important matter in the present edition ; and the result of their deliberations has been to transfer several of the " Solutions " to the " Waters ;" and several of the " Tinctures " to the " Spirits." The improvement cannot, however, as yet be regarded as being perfected ; and the definition attempted on page xiv. of the preface (near the bottom of the page,) that the committee were disposed to consider " all aqueous solutions of gases or of volatile substances as belonging to the class *Aquæ* " restricting " the term *Liquores* to solutions of non-volatile substances," can hardly be accepted as strictly accurate. Few, for instance would regard *Liquor Arsenici et Hydrargyri Iodidi* as an " Aqua," although it is an aqueous solution of volatile substances, (Iodide of Arsenic, and Red Iodide of Mercury ;) nor would any one probably be disposed to question its right to be considered a " Liquor."

Perhaps the best definitions of these varying solutions, where precision is confessedly difficult, would be to consider the term *Aquæ* as embracing the class of aqueous solutions of volatile oils and their congeners, (by which is meant such articles as Camphor or Creasote,) or of the gases. This definition would change the long established nomenclature of *Acidum Muriaticum*, and of *Acidum Hydrocyanicum Dilutum*, as well as of the newly introduced *Acidum Hydriodicum Dilutum*, and *Acidum Sulphurosum* which would become respectively " Aqua Acidi Muriatici Fortior," (corresponding to *Aqua Ammonię Fortior*,—the diluted Muriatic Acid becoming " Aqua Acidi Muriatici,") " Aqua Acidi Hydriodici,"—and " Aqua Acidi Sulphurosi." Consistency would seem to require these alterations.

" LIQUORES " should be understood to embrace all aqueous solutions of solid substances perfectly soluble, exclusive of those coming under the class " *Aquæ*." The observance of this definition would remove the *Solution of Gutta Percha* from the " Liquores,"—it not being an aqueous solution. Aqueous solutions of *liquids*, excepting the volatile oils should of course be regarded simply as " dilutions."

" SPIRITUS " should embrace alcoholic solutions of volatile oils and their congeners, or of gases.

“TINCTURÆ” should be limited to alcoholic (or hydroalcoholic) solutions of animal and vegetable substances not entirely soluble. *Partial* solubility (or the solution of a part, or of extractive matter) seems to be involved in the very idea of a *tincture*, and if this were made the essential characteristic of the class, various preparations, now called “Tinctures” would have to be excluded therefrom, on the ground of being complete solutions of entire substances. *Tinctura Ferri Chloridi*, for instance, the *Tinctura Iodini*, and *Tinctura Iodini Composita*, together with such similar preparations as may hereafter be formed, should clearly constitute a distinct class of *Alcoholic Solutions* (the analogues of the *Liquores*), designated by a common name, such as “Solutiones” or “Soluta,” employing “Solutum” as a noun.*

In like manner, preparations in other solvents, such for instance as *Ethereal Solutions*, should be separated into appropriate classes.

These views were partially acted upon by the Committee, and hence we have *Aqua Ammoniac* in place of the former *Liquor Ammoniac*; a return, by the way, to an old and discarded name. So the former *Tinctura Camphoræ* has now become *Spiritus Camphoræ*, &c.

In reviewing the history of some of these preparations, it is curious to note the fluctuations of nomenclature to which they have been subjected. *Aqua Ammoniac*, which was officinal in the Pharmacopœias of 1820 and 1830, became *Liquor Ammoniac* in the edition of 1840, remained so in the edition of 1850, and in the present edition is restored as above intimated. *Tinctura Menthe Piperitæ* was officinal in the Pharmacopœia of 1820, was dismissed from the Pharmacopœia of 1830, was restored in the edition of 1840 under the name of *Tinctura Olei Menthe Piperitæ*, remained with the same name in the edition of 1850, and is now changed to *Spiritus Menthe Piperitæ*. The *Spiritus Menthe Viridis* shared the same fortune. *Tinctura Camphoræ* was officinal in the Pharmacopœias of 1820, 1830, 1840, and 1850, and is now christened *Spiritus Camphoræ*. In the London

* We have *Infusum* instead of *Infusio*.

Pharmacopœia, this preparation has had a still more varied history. It was officinal in 1721 as *Spiritus Vini Camphoratus*; in 1746 it became *Spiritus Vinosus Camphoratus*; in 1788 it became *Spiritus Camphoratus*; in 1809 it became *Spiritus Camphoræ*, and retained this name in the revision of 1824, having been designated as a "Spirit" throughout this whole period. In 1836 it became *Tinctura Camphoræ*, being for the first time called a "Tincture," and finally, in 1851, it received back its former name of *Spiritus Camphoræ*.

The work before us furnishes several examples of return to old and discarded names. *Ferrum* which was officinal in 1820, was displaced by the *Ferri Filum*, and *Ferri Ramenta*, of the edition of 1830, which after a reign of three decades, have in turn given place to *Ferrum*. *Potassæ et Sodæ Tartras*, was the officinal title of this compound salt in the Pharmacopœia of 1820, which after having been changed in 1830 (for some reason which does not appear) to *Sodæ et Potassæ Tartras*, has now been restored to its former name. So with some of the English synonymes of the Latin names; thus "Spanish Flies" which was the English name introduced into the Pharmacopœia of 1830, replaced the English designation "Cantharides" of 1820, which designation is now reinstated. *Fœniculum* was translated "Fennel" in 1820, "Fennel Seed" in 1830, and now once more "Fennel."

These and similar changes of nomenclature, slight and arbitrary as they may appear, were not made without mature deliberation, and were in every case prompted by a careful attention to certain general principles, and an earnest desire to give greater unity and scientific method to the work, without regard to the past variations of officinal names.

But one more feature of the new Pharmacopœia can be alluded to at present, to wit, the improvement of having all the Latin or official names so marked in the general index to the work, as to constitute it a pronouncing vocabulary of the *Materia Medica*. This new facility was adopted by the Convention, at the instance of the New York College of Pharmacy, through Mr. Meakim. The plan is certainly a good one, though there may possibly be some question as to the precise force of the notation employed.

For example, such words as *Acácia*, *Bárii*, *Cerátum*, *Digitális*, *Dulcamára*, *Gentiána*, *Jalápa*, *Mucilágo*, *Sinápis*, *Tabácum*, *Valeriána*, *Veráttria*, &c., have the accented *a* marked on top with a long mark, which would doubtless cause the English reader to pronounce the words as if written *Acáycia*, *Báyrii*, *Ceráytum*, *Digitáylis*, &c., or to give the *a* the sound it has in the word "nature." We believe that by the universal practice of classical scholars throughout Europe, and we think by the usage of a majority of those of this country, the *a* is pronounced in all such words as it is in the word "nátural."

There is some little confusion prevalent between what is called a long or a short *vowel* sound, and a long and a short *syllable*. The vowels *a*, *e*, *i*, *o*, and *u*, are each said popularly to have a *long* and a *short* sound, though every vowel sound has intrinsically the same length. In poetry every accented syllable is called a long syllable, whatever its vowel sound. Thus the words *Materia Medica* have the "e" syllable accented, and therefore long, although in the second word the "e" is called short.

"*Aconítia*" and "*Spiritus*" are marked as if the "i" were to be pronounced "long," as it is called.

We cannot close without alluding to the very neat and remarkably cheap form in which the publishers (Messrs. Lippincott & Co.) have produced the work. We think the views of the Convention could not have been more thoroughly carried out. This novel form of the work is in accordance with a suggestion of Mr. Procter, (universally approved) in order that a general use of the work by physicians and apothecaries might be promoted. There can be no excuse now for any respectable physician or pharmacist in the country being unprovided with the great authoritative text-book of his profession; and we cannot too earnestly urge upon all of either profession the importance of possessing a copy, and of carefully and faithfully conforming to its provisions.

And we would advise all who may feel disposed to criticise either formulas or nomenclature, to make notes of their objections; that they may be fully and fairly considered in the preparation of the next decennial revision.

A NEW ASSAY BALANCE.

Mr. Dubois communicated the following remarks on assay-balances :

The recent receipt of two assay-beams at the Mint, procured for the use of Dr. Munson, assayer of the new branch Mint at Denver, in the Territory of Colorado, furnishes occasion for a few remarks on the progress of this delicate branch of art.

Thirty-one years ago, when Mr. Eckfeldt, the present assayer of the Mint, entered upon that office, he found that the beam on which all his operations were to turn, would not itself turn with a less weight than about the one-fiftieth part of a grain. Consequently, the nearest report of the fineness of gold was by gradations of one thirty-second ($\frac{1}{32}$) part of a carat, which was about $1\frac{3}{10}$ thousandths, according to the present notation. The reports of the British assayers were not in those days more exact, whatever their apparatus might have been.

About three years later, Mr. Peale brought from Paris, for the use of the Mint, a beam of superior finish and much greater delicacy; in which, among other improvements, stirrups were substituted for silk cords, although there was still a cord for lifting.

Two years farther on, we had Mr. Saxton restored from England to his own country, and employed in the Mint in this branch of art, in which he had already become famous. Various decided improvements were introduced by him, in the beams made for the Mint and Branch Mints.

After this artist had been claimed by Prof. A. D. Bache, for the Bureau of Weights and Measures, and was transferred to Washington, our assay department had recourse to the manufactory of Oertling, in London. His beams, although rather complicated, and of many parts, are admirable for delicacy and beauty, and for a combination of the most desirable qualities.

The establishment of the Branch Mint, already referred to, made a fresh call for assay balances. We were about to resort to the last named maker, when Dr. Torrey, of the United States Assay Office at New York, made a favorable mention of the manufactory of Becker & Son, at Brooklyn, from his own experience of what they could do. Any less authority would perhaps have been held insufficient, on the narrow but venerable

principle of questioning whether "any good thing can come out of Nazareth." The order was consequently given by Gov. Pollock, director of the Mint; and in a very short time two balances, with sets of weights, were made and delivered at the Mint.

It is not at all the purpose of this notice to enter into a detailed description of the parts and peculiarities of the different kinds of assay-beams. There is nothing like an actual inspection of them, to give a just idea of their merits; and persons who take a special interest, can easily have the opportunity. Suffice it to say, that this instrument compares favorably with any other, in respect to delicacy, philosophic propriety, good taste, and fine finish. In respect to simplicity and stability, two very important features, it may be said to excel.

There is one point of considerable account, in regard to this beam,—that its cost is about one-third the London make, namely, seventy-five dollars against two hundred and twenty-five, counting the present cost of a bill of exchange. It is difficult to understand how the Messrs. Becker can do justice to themselves, at such a price. And not only was there a saving of money, but of time also.

There is one other point worthy of a few words,—that we have here a further development of the progress of delicate workmanship in our own country. We proceed from clocks to watches, from reapers to penknives. And in regard to philosophical apparatus, if we may introduce names, it is well known, that our Ritchie, at Boston, has so improved upon Ruhmkorff, of Paris, in the powerful induction-coil (the most splendid instrument of the day), as to entitle it to be called by his own name, and to be counted *American*.

It should be stated, that the balance will indicate the tenth of a thousandth of the demi-gramme, which is our normal weight in the gold assay; that is, it will turn with $\frac{1}{1300}$ th part of a grain. As the beam and appendages are quite heavy, and capable of bearing twenty times the largest weight ordinarily used, it might be made much more sensitive by lightening the parts; but for working purposes, this is not desirable. Such a sensibility would serve to gratify curiosity, or to make a boast of, but would not be in keeping with the amount of deviation which is to be

expected in other parts of the assay—the cupellation and parting. It would be too much like the exquisite refinement of some who report specific gravities: their apparatus carries them safely to the second decimal, but their arithmetic extends to the fourth or fifth.—*Prac. Amer. Phil. Soc. May 15, 1863.*

CINCHONIA—ITS VALUE IN MEDICINE.

BY JOHN ELIOT HOWARD.

I notice in the May “Pharmaceutical Journal” a letter of Dr. Daniell’s, from Kingston, Jamaica, stating that his experience in the treatment of febrile diseases was unfavorable to cinchonine, in consequence of the cerebral disturbance which it occasioned. It is remarkable that these results of West Indian experience should be so entirely opposed to those obtained in practice in the East Indies, as treasured up by Dr. Macpherson, Presidency-Surgeon, whose work on Quinine and Antiperiodics (published at Calcutta in 1856) is by far the most original and valuable that has fallen under my notice in the English language.* Dr. M. states that cinchonine has been found, after numerous experiments on animals, and long observation on man, to produce in its state of sulphate *effects precisely analogous to those of quinine*; it causes the same cerebral disturbances and the same degrees of them, a period of excitement and of sedative action respectively; its contact with the digestive tube is neither more nor less irritating than that of quinine, only its power is less by about one-third; it is absolutely certain that cinchonine is as good a febrifuge as quinine; M. Forget has indeed reported unfavorably on cinchonine; but Dr. Hudellet, of Bourg, in 503 cases found no inferiority to quinine; this was the result in Holland with Basting and Pereira; and most authors consider cinchonine very little inferior; Dr. Macpherson therefore strongly urges the Government of India to substitute cinchonine for quinine.

Briquet’s great work, the result of eleven years of continuous

* By referring to Dr. W. F. Daniell’s remarks published in the last Journal, it will be seen that his remarks refer to the use of Cinchonine in Western Africa, and not in the West Indies, as here stated.—ED. PH. JOURN.

experiment and observation, bears similar testimony to the efficacy of cinchonine. He says that cinchonine produces nearly the same effects as quinine, with the exception of confusion of sight, of which he never saw a trace. He says that it results from his experiments that the power of sulphate of cinchonine is a third or fourth weaker than that of bisulphate of quinine. This result, he observes, is in accordance with what has been observed by others, who have been obliged to give sixty to eighty centigrammes of cinchonine, with the addition of acid, to arrest fevers which would have been cut short with a dose of forty to fifty centigrammes of sulphate of quinine at the most. He thinks that nevertheless there would be advantage in employing cinchonine on economical grounds, and that there would be no inconvenience to the patients, because its local exciting effect and its bitterness are less than in the salts of quinine. (*Traité Therapeutique du Quinquina*, pp. 991, 174, 468, Paris, 1853.)

It seems, however, that the question is not yet set at rest, and it is surely desirable that it should be pressed upon the attention of the medical world until some certain conclusion is universally adopted. It must not be forgotten that it was only after a long and severe struggle with prejudice that Peruvian bark, in any shape, was admitted in medicine.

My own experience in a large number of cases, treated gratuitously, has not presented any feature of marked difference in effect from the other alkaloids of bark. It certainly cures the agues of this country; but I do not pretend to speak minutely of its effects as distinguished from those of quinine. It is the more important to decide the question of the value of cinchonine, because several of the species of cinchona cultivated in India must be estimated as useful or worthless according to this criterion—*Lond. Pharm. Journ.*, June, 1863.

ACTION OF NASCENT HYDROGEN ON ALDEHYDES.

It is known that MM. Wurtz and Friedel have converted several aldehydes into the corresponding alcohols by means of nascent hydrogen. They were unable to effect this change with the gas obtained by the ordinary methods of converting nitro-

benzol into aniline, but they succeeded by using an amalgam of sodium.

It has occurred to M. Lorin* to effect this change by means of hydrogen obtained by the decomposition of water, at a moderately elevated temperature, by zinc in the presence of ammonia—the means by which M. Berthelot converted acetylene into ethylene. He has found that this may be done, that aldehyde and acetone are respectively converted into the corresponding alcohols, and that, in the case of aldehyde, this change is also accompanied by the production of ammoniacal compounds.

Dry aldehyde-ammonia was placed in contact with a water solution of ammonia and small fragments of zinc. The disengagement of hydrogen took place under slight pressure, and at a temperature of from 30° to 40° C.

After filtering the liquid, and distilling off one-half, the distillate was saturated with dilute sulphuric acid, then again distilled from a water bath, and one-fourth collected. Carbonate of potash caused the separation of an inflammable liquid, decomposable by sulphuric acid with production of olefiant gas, and yielding with acetate of soda and sulphuric acid, acetic ether; in short, possessing all the characters of ordinary alcohol.

Acetone, carefully purified and treated in the free state in the same manner, gave rise to the production of propyl alcohol.

The quantities of the alcohols thus obtained did not amount by weight to more than one-fifth of the quantities that should have been obtained if the conversion had been complete. Accessory products were formed by the action of the nascent hydrogen, either on the aldehydes or on the alcohols.

In the experiment with aldehyde, the residue, saturated with potash and carefully distilled into hydrochloric acid, gave a crystalline deliquescent salt, soluble for the most part in absolute alcohol, and evolving an inflammable alkaline vapor when mixed with lime.

Nitrobenzol, treated in the same manner as above, was converted into aniline.—*Chem. News, Lond., May 23d, 1863.*

* Comptes Rendus, lvi., 845.

QUANTITY OF AIR INDISPENSABLE FOR RESPIRATION
DURING SLEEP.

M. Husson* remarks, in reference to the note on this subject by M. Delbuck,† that if the majority of animals seek retired places in order to sleep, their object is merely the same as that of a man who locks his bedroom door. If the soldier sleeping in the open air covers his head with a cloak, it is chiefly with the object of protecting himself from cold. The reaper or haymaker, when resting, merely seek the shade, and do not cover their faces unless it be for the purpose of keeping away insects. At the same time it must be remembered that even in a waking state man sometimes finds it necessary to cover his face. The fact that children cover their heads with the bed-clothes before going to sleep is rather the exception than the rule, and those who do so instinctively throw off the covering during sleep.

There is no doubt that it is possible to exist for a brief time in a vitiated atmosphere, but it is not possible to continue in such an atmosphere without prejudice to health.

As for birds, who tuck their heads under their wings before sleeping, they at the same time place their beaks so that air has free access.—*Chem. News, Lond., May, 1863.*

ON THE ACTION OF CHLORIDE OF ZINC ON SILK.

BY M. J. PERSOZ, JR.

Silk rapidly dissolves in a hot concentrated solution of chloride of zinc, and more slowly in a weak and cold solution.

But though chloride of zinc readily dissolves silk, it does not destroy the texture of wool nor vegetable fibres, so that, by means of this re-agent, the complex nature of certain tissues can now be more easily distinguished. Thus, the silk may be dissolved by chloride of zinc, and the wool destroyed by soda, so as to leave only the vegetable fibres. The sample of wool and silk tissue which I have presented to the Academy, a portion of which has been immersed in chloride of zinc, will give an exact idea of this reaction.

* Comptes Rendus, lvi., 127.

† Chemical News, vii. 221.

The solvent I employed was chloride of zinc, concentrated to about 60° by the areometer. This had been kept boiling with excess of oxide of zinc till it became sensibly neutral to litmus paper. It is then a basic chloride, which, indeed, is slightly troubled on the addition of distilled water, but has the advantage of causing no alteration in vegetable tissues, which may have to be isolated in the course of the experiment.

On contact with chloride of zinc, the silk is converted into a gummy mass, preserving at first the form of the threads of the tissue, but changing gradually to transparent clots, and finally becoming completely dissolved.

Chloride of zinc at 60° gradually dissolves considerable quantities of silk, but under the influence of heat the solution will be effected in a few instants, becoming viscous and threading like a thick syrup. It then resembles a concentrated solution of gum arabic. Ammonia produces in the weak solution, diluted with water, a white precipitate, which dissolves completely in an excess of re-agent.

Being in solution in chloride of zinc, I tried in vain to separate the silk from its solvent by ordinary chemical agents, till, at last, M. Graham's dialyser occurred to me.

I first diluted the silk solution by pouring it into water acidulated with hydrochloric acid. This acid prevents the formation of the precipitate of basic chloride of zinc referred to previously, which water simply would induce.

In a former experiment I twice filtered the solution without getting rid of its slightly opalescent appearance, and I placed it in this state on the dialyser. A larger quantity of chloride of zinc passed directly, and after a few hours the liquid had become much more viscid; then it increased in volume and formed into an opaline jelly, resembling starch. This jelly contained yet a little chloride of zinc, which could not be separated on account of the new physical condition of the matter. It had the insipid taste and smell of starch, while its chemical characteristics were dissimilar. In fact, it did not puff up with caustic potash, nor liquefy with sulphuric acid. Soluble in acetic acid as steeped starch, yet if dried it no longer dissolves in this re-agent, being transformed into vitreous and brittle fragments. But I have found it to possess one singular property: evapor-

ated to dryness in a thin layer in a platinum capsule, then carefully and gradually heated, it yields a vivid gooseberry-red matter, similar in color to murexide. The color thus formed has, however, no stability. As the reaction is produced at a very high temperature, nothing up to this point indicates the animal nature of the product. Not until the temperature reaches dull red does the matter completely decompose and disengage the disagreeable odor of torrefied silk.

In the following experiments I prevented the formation of this kind of fibrine starch by diluting the solution with more water before submitting it to the action of the dialyser, and especially by heating it for a few instants, which effects the removal, by filtration, of the matters in suspension, to which is due the opaline appearance of the liquid.

With these precautions, and by means of the dialyser, all the chloride of zinc can be separated, and a limpid, colorless, and insipid liquid obtained, which, by evaporation, gives a gold-colored, friable varnish.—*Chem. News, Londons, March 7, 1863, from Comptes-Rendus.*

SOLDERS.

Soldering is the art of uniting the surfaces of metals together by partial fusion, and the insertion of an alloy between the edges, which is called solder, it being more fusible than the metals which it unites. Solders are distinguished as hard and soft, according to their difficulty of fusion. Hard solders usually melt only at a red heat, but soft solders fuse at lower temperatures. In applying solder it is of the utmost importance that the edges to be united should be chemically clean—free from oxide—and they should be protected from the air by some flux. The common fluxes used in soldering are borax, sal ammoniac, and rosin. Hard silver solder is composed of four parts of fine silver and one of copper, made into an alloy and rolled into sheets. It is quite difficult of fusion. Soft silver solder is composed of two parts of silver, one part of brass, and a little arsenic, which is added at the last moment in melting them. It will be understood that these alloys are commonly run into

convenient bars or strips for use. Silver solders are used for soldering silver work, gold, steel, and gun-metal. A neater seam is produced with it than with soft solder. It is commonly fused with the blow-pipe. A strip of thin silver solder is laid on the joint to be closed, the blow-pipe is brought to bear upon it, when it melts and runs into the joint, filling it up completely. Button solder is employed to solder white metals, such as mixtures of copper and tin. It is composed of tin ten parts, copper six, brass four. The copper and brass are first melted, then the tin is added. When the whole is melted the mixture is stirred, then poured into cold water and granulated, then dried and pulverized in a mortar for use. This is called granulated solder. If two parts of zinc are added to this alloy, it makes a more fusible solder. Fine gold cut into shreds is employed as a solder for joining the parts of chemical apparatus made of platinum. Copper cut into shreds is used as a solder for iron. Hard silver solders are frequently reduced to powder, and used in that condition. Soft solder consists of two parts of tin and one of lead. An excellent solder is made of equal parts of Banca tin and pure lead. It is used for soldering tin plate, and, if well made, it never fails. The following is a useful table of solders with their fusing points:—

No.	Parts of Tin.	Lead.	Melting deg. F.
1	1	25	558
2	1	10	541
3	1	5	511
4	1	3	482
5	1	2	441
6	1	1	370
7	1½	1	334
8	2	1	340
9	3	1	356
10	4	1	365
11	5	1	378
12	6	1	381
13	4	4 . 1 Bismuth	320
14	3	3 . 1 “	310
15	2	2 . 1 “	292
16	1	1 . 1 “	254
17	1	2 . 2 “	236
18	5	3 . 3 “	202

The alloy No. 8 is used sometimes for soldering cast-iron and

steel; the flux used for this purpose is sal-ammoniac, but common resin may be employed. Gold and silver are sometimes soldered with pure tin and a flux of resin. Copper, brass, and gun-metal are soldered with No. 8 and a flux of resin or sal-ammoniac. The chloride of zinc is used for soldering sheet and plate iron as a flux with the same solder. Lead and tin pipes are soldered by plumbers with Nos. 6, 7, and 8 and a flux of resin and sweet oil. In soldering with soft brass, the ends of the article to be soldered are secured together by a wire, and granulated solder and powdered borax are mixed in a cup with a small quantity of water, and spread along the joints with a spoon. The article is then placed in a clear fire, and the solder melts at a bright red heat, when the article is then removed from the fire. In soldering small articles with the blow-pipe, they are supported on a piece of charcoal, or, what is better, pumice-stone, and the flame is ejected upon the solder. In soldering lead pipes, the parts to which the solder is not to be attached are usually covered with a mixture of lamp-black and size. In soldering any articles care must be exercised to have the edges of the plates or articles perfectly clean, or the solder will not adhere. A flux is employed for the purpose of preventing oxidation. Resin and sal-ammoniac, powdered and mixed together, make a good flux for copper and sheet-iron soldering. In other cases, a strong solution of sal-ammoniac is used to moisten the edges of the joint, then the resin is sprinkled upon it, and the solder applied. The chloride of zinc is made by dissolving pieces of zinc in muriatic acid. It is well adapted for soldering zinc plates and pipes, and is applied with a brush to moisten the edge of the article to be soldered. The solder is then applied in the usual way with a tool. Zinc is a very difficult metal to solder, because it is so easily coated with oxide, and it also volatilises with heat.—*Chem. News, London, March 7, 1863.*

ON THE PREPARATION AND PROPERTIES OF METALLIC RUBIDIUM.

BUNSEN has prepared metallic rubidium, by igniting in a proper apparatus the carbonized bitartrate of the oxide. From 75 grammes of the salt, 5 grammes of metal were obtained in a

single mass. Rubidium is very brilliant, like silver, white, with a scarcely perceptible tinge of yellow. In the air it oxydizes instantly to bluish-grey suboxyde, and takes fire, after a few minutes, much more easily than potassium. At -10° C. it is still as soft as iron: it melts at $58^{\circ}.5$ C., and below a red heat is converted into a blue vapor with a shade of green. According to Bunsen, the true fusing point of sodium is $95^{\circ}.6$ C., and that of potassium $62^{\circ}.5$ C.; the latter does *not* pass through an intermediate pasty condition in fusing. The density of rubidium is about 1.52. It is considerably more electro-positive than potassium, takes fire upon water and burns with a flame which cannot be distinguished from that of potassium by the eye. Rubidium burns with brilliancy in chlorine and in vapor of bromine, iodine, sulphur, and arsenic.—*Am. Jour. Sci. and Arts, from Ann. der Chemie und Pharmacie*, cxxv. 367. W. G.

ON THE ELECTRO-CHEMICAL DECOMPOSITION OF INSOLUBLE SUBSTANCES.

By M. BECQUEREL.

Whilst seeking to oxidise silicium at the positive pole, in distilled water, with a pile of eighty elements of sulphate of copper, I found that this metalloid is not, as has hitherto been supposed, a non-conductor, but that it possesses, when traversed by an electric current, sufficient conductivity to produce remarkable caloric effects, by reason of its great resisting powers. By putting small cylindroid crystals of silicium, prepared by M. Deville's process, into a porcelain, or better still a platinum capsule, in communication with one of the poles of the pile, and closing the circuit with a platinum wire, at least one millimetre in diameter, then by simply touching with this wire one only of the crystals, the adjacent crystals become incandescent. All the crystals follow the wire when it is raised, forming a small chain at reddish-white heat; at the same time a white smoke arises more or less visible, according to the force of the pile, and possessing an odor rather like that produced by breaking a piece of flint.

The intense heat is really produced by the resistance offered

to the electricity when travelling the silicium ; for this result is obtained by using a pile of such force, that by touching the platinum capsule with a wire of the same metal only a feeble spark is emitted.

In experimenting with a nitric acid pile of twenty elements the heat is so intense that the platinum vessel is perforated, being melted where it comes in contact with the substance, as well as the end of the platinum wire, and, at the same time, a white smoke is disengaged, with formation of silica deposited as powder on the melted platinum, and also some silicide of this metal.

With charcoal electrodes complex effects are obtained, resulting from their combustion and the effects above described. The light is then too brilliant to be borne by the naked eye. In this and the preceding instance it is necessary to operate on a plate of rock crystal, the surface covered with silica ; under the microscope this silica appears to be in a vitreous condition.—*Chem. News, London, May 9th, 1863, from Comptes Rendus, February, 1863.*

USE OF SULPHUROUS ACID IN THE MANUFACTURE OF SUGAR.

M. A. Reynoso* points out that the use of calcium bisulphite is prejudicial rather than advantageous. The excess of acid uniting with oxygen produces sulphuric acid, which reacts upon the sugar, converting it into grape sugar, and eventually into ulmic and formic acids, and ulmin, thus tending to produce color, instead of bleaching the saccharine liquid. Hence, he states that when the sulphite is used it should always be with an excess of lime. It is indispensable that the cane juice should be so alkaline as to turn litmus-paper blue. In the absence of litmus-paper, the alkalinity of the cane juice may be ascertained by its turbidity, and by the formation of a pellicle on the surface of a small portion when it is breathed upon.—*Chem. News, London, May 30, 1862.*

* Diario de la Marina and Comptes-Rendus, lvi. 46.

ON HYDRASTIA.

By F. MAHLA, Ph.D., Chicago, Ill.

Hydrastia was detected by Durand, in Philadelphia, as early as 1851, who noticed its alkaline nature, but did not succeed in preparing it in a pure state.

It is contained in *Hydrastis canadensis*, in which it is associated with berberina. Mr. J. D. Perrins, of Worcester in England, first separated it from this plant in pure form, and described some of its properties, but did not institute an elementary analysis. At the time of Mr. Perrins' investigations, I had, prompted by the remarks of Prof. Procter, of Philadelphia, also prepared pure hydrastia, and intended to analyze it; seeing, however, that Mr. Perrins had promised to study its composition, I did not continue my investigations. After the lapse of more than a year, I do not any longer hesitate to finish my researches, and take the liberty to publish herewith the results.

Hydrastia may be obtained by adding aqua ammoniæ in slight excess to the liquid from which the berberina has been previously separated by an addition of chlorhydric acid. The precipitate, obtained under these circumstances, is collected on a calico filter, freed by expression from water, and mixed with strong alcohol, in which it easily dissolves by application of heat. On cooling, the hydrastia crystallizes readily, and may be purified from adhering coloring matter by redissolving and recrystallizing it several times with alcohol.

Hydrastia crystallizes in forms which belong to the right prismatic system. They are combinations of the longitudinal with the vertical prism, in which the planes of the first-mentioned form are prevailing. It is perfectly white, and its crystals exhibit great brilliancy. Hydrastia in the pure state is tasteless; its salts, however, have a bitter, heating, acrid taste. It melts like a resin, when heated to 135° C.; it decomposes at a higher temperature with emission of yellowish vapors, the odor of which resembles that of carbolic acid. When heated on platinum foil, it readily takes fire and burns with a smoky flame.

Hydrastia is insoluble in water; it dissolves, however, in al-

cohol and in ether. It is not affected by a dilute solution of caustic potassa, even if boiled with it for a prolonged period. Concentrated nitric acid does not at first act on it, but dissolves it afterwards with a red color.

Hydrastia dissolves in cold concentrated sulphuric acid, and imparts to it a yellowish tint; this mixture when slightly warmed, assumes a red color; bichromate of potassa produces with it a dark brown coloration, which is distinct, however, from the strychnia reaction, in as far as it does not show any blue or violet shades.

It dissolves readily in diluted hydrochloric acid; ammonia and caustic potassa produce in this solution white precipitates, which are insoluble in an excess of the reagent; ferrocyanide and iodide of potassium generate also white deposits; iodine dissolved in a solution of iodide of potassium produces a cinnamon brown precipitate, which, when heated with the liquid in which it is suspended, contracts readily to a resinous mass.

Bichloride of platinum precipitates the solution of muriate of hydrastia with a yellowish red, chromate of potassa with a yellow color. This latter precipitate dissolves when heated with the liquid, in which it is suspended, but separates again on cooling; before dissolving, it assumes, in the liquid, the appearance of a melted resin.

Terchloride of gold produces in the solution of muriate of hydrastia a reddish-yellow precipitate, which also contracts in the liquid on application of heat, and looks like melted resin; it, however, finally dissolves. Sesquichloride of iron produces no change.

In order to subject the hydrastia to an elementary analysis, it was desiccated at a temperature of 100° C., until it ceased to diminish in weight.

The analysis itself yielded the following results:

- I. 0.5013 hydrastia, burned with oxyde of copper, gave
1.2260 carbonic acid, and
0.2712 water.
- II. 0.5085 hydrastia, burned with oxyde of copper, gave
1.2377 carbonic acid, and
0.2608 water.

III. 0.4469 hydrastia, burned with soda-lime for nitrogen-determination, gave

0.2727 ammonio-chloride of platinum.

IV. 0.5904 hydrastia, burned with soda-lime, gave

0.3542 ammonio-chloride of platinum.

These results lead to the following percentage composition :

I.	II.	III.	IV.
C = 66.696	66.379		
H = 6.010	5.698		
N =		3.822	3.767

In order to determine the formula of the alkaloid, I selected the platinum double salt, prepared by precipitating the hydrochlorate of hydrastia with chloride of platinum, and the hydrochlorate itself.

The chloroplatinate of hydrastia is an amorphous reddish-yellow powder, which is slightly soluble in water, better, however, in alcohol. When its alcoholic solution is boiled for some time, the platinum separates in the form of a black powder. The liquid, in which this deposit forms, has a remarkable blue fluorescence.

Chloroplatinate of hydrastia fuses, when heated to a little above 100° C.; it decomposes readily when heated higher.

1.0079 chloroplatinate of hydrastia, desiccated at 100° C., gave on careful ignition

0.1630 platinum.

This corresponds to 16.17 p. c. platinum.

The chlorhydrate of hydrastia is obtained by dissolving pure hydrastia in diluted chlorhydric acid. The solution obtained is evaporated over the water-bath to dryness. It then forms a gum-like white substance, which can be readily powdered. It is easily soluble in water and alcohol. Its aqueous solution has a strong blue fluorescence. It is uncrystallizable.

In order to determine the proportion of chlorhydric acid, which is in combination with the hydrastia, I dried the powdered salt for a long time at a temperature of 100° C., and then precipitated its aqueous solution with nitrate of silver :

0.7258 hydrochlorate of hydrastia gave

0.2419 chloride of silver.

This amount corresponds to 8.46 p. c. of chlorhydric acid.

From these results, I calculate $C_{44}H_{24}NO_{12}$ as the formula and

equivalent for hydrastia. Indeed, if we figure the percentage composition of a body with this formula, and compare it with the obtained data, we find that they agree well :

Hydrastia = $C_{44}H_{24}NO_{12}$ in 100 parts :

		Found.	Calculated.
Carbon,	=	66.696	66.379
Hydrogen,	=	6.010	5.700
Nitrogen,	=	3.832	3.767
Oxygen,	=	23.462	24.154
			24.118

The chloroplatinate of hydrastia, $C_{44}H_{24}NO_{12}, HCl + PtCl_2$, requires in 100 parts 16.32 p. c. platinum ; I found 16.17 p. c.

The chlorhydrate of hydrastia = $C_{44}H_{24}NO_{12}, HCl$, contains, according to its formula, 8.34 p. c. chlorhydric acid, while I found 8.46 p. c.—*Am. Jour. Sci. and Arts*, July, 1863.

ADDITIONAL OBSERVATIONS ON STORAX.

BY DANIEL HANBURY, F.L.S.

When I had the honor of laying before the Pharmaceutical Society some observations on Storax,* I hoped to be able to communicate at no distant interval such additional information as would complete the history of that drug. During the six years that have since elapsed, I have not lost sight of the subject, and although I am still unable to determine all the points I wished to clear up, I am induced by reasons which I will presently explain, again to bring it before the Society.

To render my remarks more intelligible, I will briefly recapitulate the conclusions which my former paper was intended to establish and which are the following:—

1. That the storax of ancient times was produced by *Styrax officinale* L.
2. That this substance has disappeared from the commerce of modern days.
3. That the resin called *Liquid Storax* is produced by *Liquidambar orientale* Mill., a tree indigenous to the south-west of Asia Minor, where the drug is collected.

These conclusions I had reason to believe were generally ac-

* *Pharm. Journ.* vol. xvi. p. 417.

cepted, until I received a few weeks ago a pamphlet by Professor Stamatiōs D. Krinos of Athens, which somewhat disputes their correctness. In vindicating my own opinions, however, I wish to draw attention to the new facts put forth in the learned essay of the Greek Professor of Pharmacology, and to couple with them some additional information on Storax of which I have become possessed.

Professor Krinos, whose pamphlet entitled *Περὶ Στοράκος Διατριβὴ φαρμακογραφικὴ* (*A Pharmaceutical Essay on Storax*),* is in modern Greek,† commences by stating that he will endeavor to show :

1. That *Liquid Storax* was known to the ancient Greek physicians.
2. The reasons why he presumes that the text of Dioscorides requires a slight change.
3. That the *Solid Storax* of ancient authors was not the produce of *Styrax officinale* L., but of the tree called in modern Greek *ζυγία* and by botanists *Liquidambar orientale*, namely, the same tree as that from the bark of which *Liquid Storax* is obtained by decoction and expression.

In support of the first proposition, Dr. Krinos gives an elaborate review of the ancient accounts of storax, from which, but especially from the statements of the later Greek writers he draws the conclusion that Liquid Storax was a drug with which they were acquainted. In the works of Paulus Ægineta, he observes, we first find mentioned besides solid storax, a second kind *liquid storax* and also the resin of the tree *ζυγία*, which is the same thing as Liquid Storax. Aetius, who lived in the sixth century is cited as mentioning a *liquid storax* ; and also a spurious treatise of Galen, the writer of which referring to the resin of *ζυγία* explains that it is synonymous with Liquid Storax. The Arab authors are then reviewed, and subsequently the pharmacologists of the last and present century. The learned author then points out that the word *ζυγία* properly signifying *maple*, is now applied in the south-west of Asia Minor to *Liquidambar orientale*, a tree which resembles a maple or a

* Εν Αθηναῖς, 1862, 8vo. p. 27.

† I am indebted to the kindness of D. P. Scaramanga, Esq., for translating the pamphlet.

plane. He also states that about the year 1841, he proved that Liquid Storax was obtained from this tree, and that an account of this fact was published at the time in the *Melissa*, an Athens newspaper.

The second proposition of Professor Krinos is that the text of Dioscorides is incorrect. Dioscorides states that the storax-tree resembles the quince, which is certainly the case if *Styrax officinale* is intended, but by no means so if *Liquidambar orientale*.* But Professor Krinos holds that the Storax (solid and liquid) of ancient authors is *not* the produce of *Styrax* at all: hence the difficulty of admitting the statement of Dioscorides, and the extraordinary proposal of *altering the text* so as to cause that author to say that the tree resembles not a quince but a maple. In reply to this I may remark that it would be needful to alter Pliny also, and that such a mode of disposing of the difficulty, unless supported by some obvious ambiguities in the early MSS. of these ancient authors, is surely inadmissible.

The third proposition that the solid storax of the ancients was derived from *Liquidambar* and not from *Styrax* is one from which I entirely dissent; still I am free to admit that a solid resin derived from the former tree *may* have passed as Storax in ancient times, though I am entirely unacquainted with such a substance. Professor Krinos assumes that as no resin produced by *Styrax officinale* now finds its way into commerce, it is impossible to believe that that tree ever yielded any. In this I do not concur: I have already shown that two respectable authors of the last century, Duhamel and the Abbé Mazéas actually collected storax from this tree, the one in Provence, the other in the neighborhood of Rome. I have also ascertained within the last few weeks from Dr. Kotschy of Vienna, that in the neighborhood of Alexandretta, the *Styrax*, which there grows to a tree, still yields its odorous resin. On the other hand I am bound to acknowledge that the endeavors I have hitherto used to obtain the resin from trees in the south of France, Asia Minor and Syria have not been successful. In Syria it is now rare to find the Stryax forming anything better than a large bush, owing to the practice of cutting it periodi-

* In modern Greek, the Storax tree is called 'Αγρία Κουδανία i. e. *Wild Quince*.

cally for fuel, and though I have myself examined many such bushes I have failed to find upon their stems any exudation. I believe however that where the *Styrax* attains the dimensions of a tree, better results will be obtained, and the correctness of the ancient accounts will be fully vindicated. Not only does the statement of Dioscorides that the Storax-tree *resembles a quince* indicate that he could not possibly have had the Liquidambar in view, but moreover the allusion made by him, and especially by Pliny to localities in Syria where *Styrax*-trees, but not Liquidambar, are still found, lend some weight to the argument. The geographical distribution of *Liquidambar orientale* is very restricted, in which respect it differs from *Styrax*. In the extreme south-west of Asia Minor it is gregarious, forming forests of trees of from 20 to 60 feet in height. Dr. Kotschy informs me that he has reason to believe it occurs at Narkislik, a village near Alexandretta and also on the Orontes. He also tells me that six fine old trees, *certainly planted*, exist at the convent of Antiphoniti on the north coast of Cyprus, but that there are no others in the vicinity : that the tree is there called *ξύλον τοῦ Εφάρτη* (Governor's wood) and that it and the bark are used as incense in the churches. He adds that there are two trees of the same kind at the convent of Neophiti near Papho, but no others on the island. Professor Krinos states that the Liquidambar is common in Syria, a fact which is not borne out by the researches of botanists who have visited that country,* not one of whom has noticed its occurrence.

For these reasons I am not prepared to renounce the opinion that the storax-tree of Dioscorides and other ancient writers was the *Styrax officinale* of modern botanists, nor can I abandon the idea that, like its congener *S. benzoin*, it is capable of yielding an aromatic resin, which was once obtained in sufficient abundance to form an article of trade.

Before quitting the subject of Storax, I think it desirable to offer a few observations on some of the substances that are known in pharmacy under that name, and first we will take *Styrax calamita*.

* As Boissier, Gaillardot, Blanche, Roth, Bove, Michon, De Saulcy, Lynch, Erdel, Ehrenberg, Hooker, etc.

This drug as found in English commerce is so singularly variable that it would be difficult to suppose it a natural product. At Trieste where certainly some of it is manufactured, it is prepared (as I have ascertained on the spot) by mixing the residual liquidambar bark called *Cortex Thymiamatis*, reduced to coarse powder, with Liquid Storax. Such a mixture I have prepared myself and can assert that it constitutes excellent "*Styrax calamita*." When first mixed (in the proportion of 3 to 2,) it forms a somewhat moist and clammy mass, which in the course of a few weeks develops an infinity of minute silky crystals, giving the whole an appearance of mouldiness. If the bark is scarce, common sawdust, I am informed, is substituted for it; and olibanum, red earth and honey are also employed in producing *Styrax calamita* of inferior quality. The drug is said to be manufactured also at Venice and Marseilles.

According to Professor Krinos, the Greek monks, particularly those of the island of Symi, prepare by mixing olibanum with Liquid Storax certain resinous cakes which they sell for incense under the name of *Λευδομίσχον* or *στυράκι*. It is a compound of this sort, that, in my opinion, constitutes the *Black Storax* described by Guibourt, Pereira and others, and not unfrequently found in continental drug warehouses. In fact I have more than once prepared such a mixture, which is remarkably fragrant and quite devoid of the coal-tar-like odor of Liquid Storax; an efflorescence of cinnamic acid generally develops itself on the surface of the mass. It is also this substance which appears to constitute the precious incense used at Easter in the Church of the Holy Sepulchre at Jerusalem, and of which small pieces are sold to the pilgrims at an enormous price,—not indeed for burning, but chiefly to be carried as a charm.

In conclusion I wish to express an earnest desire that any traveller visiting Asia Minor or Northern Syria, or resident in either of those countries would carefully examine the stems of *Styrax officinale* with a view to discover any adherent resin,—still more that he would perforate the trunk of that tree and observe after the lapse of some time whether such perforation is followed by an exudation of resin.

The President inquired of Mr. Hanbury the age and size to which the *Styrax officinale* now commonly attained. He was

induced to do so from having noticed that some substances yielded by plants could only be obtained from them when these had arrived at a great age. Thus the Ivy, when of a considerable age and size, produced a kind of gum, with a peculiar aromatic odor, but this gum was never observed on the Ivy under other conditions and circumstances, and was a rare product. He had found on some fine old Ivy-trees at Conway-castle, on one occasion, about half an ounce of the gum.

Mr. Hanbury stated that he had no doubt the absence of solid storax at the present time arose from the cause just alluded to by the President, namely, the rarity of old and large trees of *Styrax officinale*; for although the *Styrax*-tree was widely distributed, being found in Syria, the Levant, Southern France, and some of the other warmer parts of Europe, in very few spots was it to be found of any great size and age. In Syria this was easily accounted for, from the scarcity of wood generally, and all trees therefore which could be cut down by the rude tools which the inhabitants possessed, were used for fuel.

Professor Bentley said that the conclusions come to by Mr. Hanbury in his papers, were commonly so well substantiated, and arrived at only after so much consideration, that he should require very conclusive evidence to the contrary before he ventured to call his results in question. On the present occasion it did not appear to him that Professor Krinos had brought forward any satisfactory reasons in support of his statement that the text of Dioscorides was incorrect. Perhaps Mr. Hanbury, who had carefully read his pamphlet, could state what substantial reasons Professor Krinos had adduced. The ancients, Professor Bentley said, were good observers of natural objects, if not botanists, and it seemed to him quite clear that when Dioscorides stated that the storax-tree *resembled the Quince*, he did not mean that it *resembled the Maple*.

Mr. Hanbury could not find in Professor Krinos' pamphlet any reasons adduced for the alteration of the text of Dioscorides which would be at all satisfactory to a classical scholar. Professor Krinos appeared to have come to the conclusion that the tree yielding the solid storax of the ancients, was like the maple, and therefore the easiest way of overcoming the difficulty

of the text of Dioscorides was to alter it. Every author of importance had stated the storax tree to be like the quince, and consequently to oppose this view without good grounds seemed altogether unwarrantable.

Professor Bentley was glad to hear from Mr. Hanbury that *Styrax calamita* was really, so far as he knew, made up of liquid-ambar bark and liquid storax. It was consequently a genuine drug, in which the liquid storax and the bark, which had been separated from each other, were again united. *Styrax calamita* was, however, such a variable substance, that he (Professor Bentley) could not doubt that it was sometimes compounded in other ways. Professor Bentley remarked, that the only point necessary to prove to demonstration Mr. Hanbury's conclusions as to the origin of the solid storax of the ancients, was to find the storax *in situ*, on the *Styrax officinale*. It did seem to him somewhat remarkable, considering the wide distribution of this plant, that some trees should not exist of sufficient size and age to secrete solid storax. In Syria, as Mr. Hanbury had stated, the absence of trees of any great size was accounted for, but this did not satisfactorily explain the absence of such a secretion from other districts, where some large and old trees must surely exist. He had but little doubt, therefore, having full confidence in Mr. Hanbury's conclusions as to the origin of solid storax, that in course of time some would be found *in situ*. In order that the secretions should be formed, it was necessary, Professor Bentley said, that the plant should be found growing in a situation which was perfectly natural to it, that is, where every condition favorable to its development was present.—*Lond. Pharm. Journ.*, April, 1863.

ON A NATURAL FORMATION OF CARBONATE OF SODA.

BY R. HAINES, M. B., Professor of Materia Medica, Grant College,
Bombay.

Some months ago a substance was brought to my notice by the Curator of the Economic Museum in this town, Dr. Birdwood, said to be a natural product of the neighborhood of Aden, and to be used only for mixing with and imparting pun-

gency to snuff. It consisted of irregular, nearly colorless, partly crystalline masses, composed apparently of two distinct portions: one was a brilliant, confusedly crystalline mass, amongst which the angles of cubical crystals could be observed, the other, which seemed to be the upper portion, was a white amorphous substance, of a greasy feel, and rather strong soapy odor, very similar to that of crude borax. By taking portions of a number of lumps, and pounding the whole together, a fair average sample was procured.

Dissolved in water, a colorless solution was obtained, alkaline to test paper, and effervescing strongly with acids. Supersaturated with nitric acid, it yielded an abundant precipitate with nitrate of silver, a scanty precipitate with chloride of barium, and a slight crystalline precipitate, after some hours, with ammonia and phosphate of soda. A concentrated solution gave no precipitate with chloride of platinum and alcohol. The dry salt being rubbed with sulphuric acid, and then with alcohol, did not impart to the flame of the latter the slightest tint of green. From these experiments it appears that the salt consists of carbonate of soda and chloride of sodium, with traces of sulphuric acid and magnesia, but that it contains neither potash nor boracic acid.

8.668 grammes, dissolved in water, left an insoluble residue of fine sand, weighing .377 grammes, equal to 4.35 per cent. The filtrate was made up to 100 cubic centimetres. Of this, 10 cubic centimetres required for neutralization of Mohr's normal acid 8.35 cubic centimetres, equivalent to .1837 grammes of carbonic acid, and to .44255 grammes of dry carbonate of soda. 50 cubic centimetres of the filtrate were therefore equivalent to .9185 grammes of carbonic acid, and the whole 100 cubic centimetres to 4.4255 grammes of dry carbonate of soda, or 51.05 per cent.

50 cubic centimetres of the same filtrate, treated in a carbonic acid apparatus with sulphuric acid, lost .915 grammes of carbonic acid. The carbonate is therefore a neutral salt. 4.963 grammes, gently ignited to incipient fusion, lost .976 grammes, equal to 19.66 per cent.

From these data the following composition is deduced:—

Neutral carbonate of soda	51.05
Common salt, with traces of sulphate of soda and chloride of magnesium	24.94
Water and organic matter	19.66
Sand	4.35
	<hr/>
	100.00

Subsequent information, obtained through the kindness of Captain Playfair, the Assistant Political Resident at Aden, was to the following effect:—"The substance is found all along the coast to the east of Aden, to an extent of perhaps ten miles, and its quantity is practically unlimited. It is usually found in hollows behind (or beyond) high-water mark, to which the sea-water has access by percolation. There is no demand for it at present, but some months ago sixty to seventy camel-loads a day were brought into Aden, and it met with a ready sale at $2\frac{1}{2}$ rupees per ten maunds (equal to two shillings a hundred weight). The only use made of it is to mix with snuff, to increase the pungency; rarely, too, it is used for washing clothes. It is variously called by the Arabs *Dukduka*, *Hurka*, and *Kara*."

From the valuable paper published by Mr. H. J. Carter in the transactions of the Bombay Branch of the Royal Asiatic Society, on the Geology of Arabia, it appears that the whole of the south-east coast of Arabia, from Ras-ul-Had to Bab-ul-Mandib, is capped with nummulitic limestone, pierced at frequent intervals with basaltic effusions, and in many places elevated so as to form lofty and abrupt cliffs, in which, beneath the limestone, other formations are visible. As a result of this formation, the shingle on the coast consists mainly of limestone; and although no specific description of the coast immediately to the east of Aden has been given, there is no reason to doubt that the same peculiarities prevail there. It is then to the percolation of sea-water through a stratum of fragments of limestone that we must attribute the production of the carbonate of soda, by which percolation, probably, a partial interchange of elements has been effected between the chloride of sodium and the carbonate of lime, giving rise to the formation of chloride of calcium and carbonate of soda. It has been long

suspected that the natural production of carbonate of soda was dependent on the presence of carbonate of lime, and was brought about somewhat in this way; but what the conditions are under which the separation of the carbonate of soda from the chloride of calcium is effected, without allowing the former to exert its ordinary converse action upon the lime-salt and reproducing carbonate of lime, is a question that would form a very interesting subject of scientific inquiry. This is, I believe, the first time that the natural production of alkali from sea-water itself, without organic agency, has been observed.

It is hardly probable that the production of carbonate of soda in this way is limited to a few miles' distance from Aden. As the shore is so very similar along the whole 1125 miles which form the south-east coast of Arabia, there is a reasonable expectation of finding it at many places elsewhere; and an article so much in request, so easily procured, and with water-carriage close at hand, might yield a fair amount of profit to an enterprising shipper who should collect or purchase it upon the spot.—*Lond. Pharm. Journal*, July, 1863.

POROSITY OF PLATINUM TUBES.

MM. St. Claire Deville and Troost* have recently made some experiments, the results of which show that platinum vessels cannot be employed for experiments with gases or vapors at high temperatures.

By passing a uniform current of dry air through a platinum tube fitted within a porcelain tube, through which a uniform current of pure dry hydrogen was passed, and applying heat to the tubes, it was found that the air issuing from the platinum tube contained less and less oxygen as the temperature was increased, and that water condensed in the tube through which the air was discharged from the platinum tube. At about 1100° C. the gas consisted only of nitrogen and water vapor, and at the same time the hydrogen discharged from the outer porcelain tube was sensibly reduced in quantity.

The composition of the gas discharged from the platinum tube at gradually increasing temperatures above a red heat was—

* *Comptes-Rendus*, lvi. 977.

Oxygen . .	19	16.7	15.5	12.3	10.5	8.8	5.9	3.0	0
Nitrogen .	81	83.3	84.5	87.7	89.5	91.2	94.1	97.0	100

When the temperature exceeded 1100° C., the gas from the platinum tube also contained hydrogen from 1.2 to 21.9 per cent., according to the temperature.

The water collected contained some nitric acid.

By reducing the temperature, the gas discharged from the platinum tube was eventually pure air, as at the commencement of the experiment.

During the whole time, the hydrogen discharged from the outer tube was entirely absorbable by oxide of copper.

By rapidly closing the tube supplying the hydrogen to the outer tube, and immersing the discharge tube in mercury while the temperature of the tubes was high, the mercury rose to the height of 602 millimetres (the barometer being at 753), the small difference of 15 centimetres being due to the slight leak in the apparatus.

By passing a current of pure dry carbonic acid through the platinum tube, and a current of hydrogen through the outer tube, a large amount of carbonic oxide was produced, and discharged with carbonic acid and hydrogen in the following proportions, according to the temperature :

Hydrogen . .	12.7	7.3
Carbonic oxide .	—	17.7
Carbonic acid .	87.3	75.0
	<hr/>	<hr/>
	100.0	100.0

When the current of hydrogen in the first experiment was replaced by a current of carbonic oxide, this gas did not penetrate to any extent into the platinum tube.

These experiments were made with two tubes one millimetre thick (about 0.04 inch) and six inches long. They were heated to about one-fourth of their length. The tubes were manufactured in the ordinary manner for sulphuric acid retorts; they maintained a vacuum, and had been tested by high pressure.

All the above experiments were repeated by the tube made of melted platinum by Messrs. Johnston and Matthey about 0.08 inch thick and 24 inches long, but, notwithstanding this

greater thickness, the results obtained were exactly the same.
—*Chem. News, London, June 20, 1863.*

ON SOME NEW PROPERTIES OF SULPHUR.

BY M. DIETZENBACHER.

A small quantity of iodine, bromine, or chlorine modifies in a remarkable manner the physical and chemical properties of sulphur. It becomes soft and malleable at the ordinary temperature, and maintains this form for a long time. This modification of sulphur, discovered by M. Charles Sainte-Claire Deville, and by him called *insoluble sulphur*, is almost entirely transformed by this process.

1. By heating a mixture of 400 parts of sulphur and one part of iodine, to about 180° , and then cooling it, a sulphur results remaining elastic for a considerable time. By pouring the sulphur on a glass or porcelain plate, flexible laminæ are obtained. This takes place with even a much smaller proportion of iodine.

Iodide of potassium acts in the same manner as iodine.

Treated in this way by iodine, sulphur becomes insoluble in sulphide of carbon. The liquid turns violet.

2. The action of bromine on sulphur is analogous to that of iodine; only instead of being black with a metallic lustre, the sulphur is of a wax-yellow color, and is much softer, and remains soft. This modification is produced with 1 per cent. of bromine, and about 200° of heat.

This sulphur is composed of from 75 to 80 per cent. of sulphur insoluble in sulphide of carbon.

3. By passing a current of chlorine on sulphur heated to about 240° , a soft kind of sulphur is obtained, easily drawn out, and the fragments of which readily adhere and unite.

With sulphide of carbon it behaves in the same way as sulphur treated by bromine. When freshly prepared, however, the sulphur, modified by the chlorine, yields about 10 per cent. more matter soluble in sulphide of carbon.

After being worked up for one or more hours, sulphur hardens suddenly, and becomes completely insoluble in sulphide of carbon.

These facts may throw light on some of the details of the manufacture of India-rubber vulcanised by sulphur and chloride of sulphur. Some of them confirm the results already obtained by M. Berthelot.—*Chem. News, Lond., March 7, 1863, from Comptes-Rendus.*

ON COMMERCIAL PERCHLORIDE OF PHOSPHORUS.

BY M. MULLER.

This compound has been for some time manufactured on the large scale, by saturating a solution of phosphorus in sulphide of carbon by dry chlorine. Some inconveniences attend this process, the worst being the liability of the product to become sulphurous,* and another, that it often contains free phosphorus, as is notably the case when the sulpho-carbonic solution is over concentrated, and cooled too suddenly at the beginning of the operation, before all the phosphorus has passed to the state of protochloride. In this case, a fawn-colored and waxy product is obtained, clearly distinguished from pure pentachloride, which is yellow and crystalline.

If, after the operation, sulphide of carbon, forming the mother waters, is simply decanted, when cold the crystalline crust can be preserved intact for some time ; but, after a certain time, it liquefies, and is reduced to protochloride of phosphorus. When much free phosphorus is present, this reduction can be effected suddenly, but then giving rise to dangerous projections.

To obviate these difficulties, M. Muller proposes, in place of the sulphide of carbon here serving as a vehicle, to substitute protochloride of phosphorus, which is also liquid. Phosphorus is then introduced, and the current of chlorine continued unto saturation. The operation can be repeated *ad infinitum* ; the author proposes to conduct it in special wide-mouthed bottles, closed with India-rubber caps adjusted by rings, the stoppers being pierced to admit the pipe for the escape of the disengaged chlorine.—*Chem. News, London, Jan. 24, 1863, from Zeitschrift für Chem. und Pharm.*

* When cold, sulphide of carbon is only feebly attacked by chloride of phosphorus, and it is only in the end that the product becomes sulphurous, but, with heat, the reaction is very sensible.

AUSTRALIAN PRODUCTS IN THE INTERNATIONAL
EXHIBITION OF 1862.

By MR. A. REDFORD.

Perhaps the most striking object in the Australian portion of the International Exhibition, that ever-memorable record of the world's industry, was the pyramid of the commissioners, representing the quantity of gold exported from Victoria from 1851 to 1861.

This novel illustration of the amazing richness of the colony in the precious metal was well calculated to strike the attention of the public, and enable us to realize in some faintly practical manner the meaning of such sounds as I am about to utter, viz.:—weight, 26,162,432 troy ounces ; 1,793,995 lbs. avoirdupois, or 800 tons, 17 cwt., 3 qrs., 7 lbs. ; solid measurement, 1,492½ cubic feet ; and value, £104,649,728 sterling. The height of the pyramid was nearly 45 feet, and measured 10 feet square at the base.

After treating of the “cost of production,” and the proportion between “labor and luck,” as shown in the statistics relating to gold mining in Australia, Mr. Redford gave a description of several remarkable nuggets which have been found from time to time, and also mentioned some other Australian minerals. He then proceeded to describe the vegetable products of Australia. As might be expected in a climate so favorable, the vegetable products are numerous and interesting. Forest trees abound of magnificent proportions, valuable alike for their timber, bark, gum, and leaves, from which we shall see abundant essential oils are obtained.

The forest trees consist of about 150 different species, of which upwards of 90 were represented in the Exhibition, and through the skill and great care of Dr. Muller, the Botanist Royal, the whole have been identified with strict botanical accuracy.

The Acacias, of which the wood of 14 kinds were shown, are very abundant in Australia. The pretty yellow plants sold at our flower-stalls must occur to the minds of many ; they belong to the same class of Leguminous plants of the sub-order Mimosæ. The Acacias form a leading feature in the botany of Australia, and are to be seen covering acres of ground, as the Yel-

low Wattles and others. They produce Gum Acacia and Gum Senegal in India and Africa; and one Tasmanian species—*Acacia sophora*—yields a food which is made into chocolate by the natives. Some few are poisonous. These trees are not generally large; the largest of them, I think, attains to 30 ft. in height, and 1 ft. in diameter. This is the Mayall, or *Acacia homatophylla*. The wood is very hard, and smells of violets; it is dark and beautiful, and much prized for turning, etc. Spearwood, or *Acacia doratoxylon*, as its vernacular name implies, is used for spears and other weapons by the natives; it is durable and hard. Blackwood, another of the Acacias, *Acacia melanoxylon*, is pronounced by the Jurors to be the most valuable of all our colonial timber. It is admirably adapted to every description of light and heavy framing, to cabinet and ornamental work, to shafts and wheels, and all kinds of turnery. It resembles the best walnut, and receives a very high and beautiful polish. The Wattle is the only other Acacia that need be mentioned, *Acacia mollissima*. This tree is almost universal in Australia, and is used by coopers for their staves, while the bark is extensively employed for tanning. The tanning of colonial leather is entirely carried on by means of their own barks, of which the Mimosa or Wattle bark is the most valuable. There was exported from Australia in 1858, 249 tons of bark, value £2,800; and in 1860, 654 tons 13 cwt., value £6,382—it is worth £4 per ton. Such improvements have been made of late in their tanneries and fellmongeries, of which there are a very large number, that colonial-made sole and harness leather is now preferred to the imported article. Four species of these trees furnish true gums, which exude from the trees as do the Acacia gums of commerce, and in some samples the masses are so cracked as to present a very white appearance. We must now turn to the trees of Australia *par excellence*, I mean the stately Eucalypti, or Gum-trees. These belong to the order Myrtaceæ, or Myrtleblooms, an order comprising within its limits a variety of size which is truly singular, so that we may almost say that in size it ranges, like Solomon's botany, from "the Hyssop which springeth out of the wall, to the Cedar of Lebanon." Prof. Lindley remarks—"There are all kinds of intermediate sizes from the common myrtle bush to the gigantic Eucalpyti of Australia ;

some rise 200 feet in height with straight trunks, clear of branches for from 100 to 150 feet, and resembling an assemblage of elegant columns. These are crowned with branching tops of light willow-foliage; and some of the stringy-bark trees rise nearly as high as the Monument without branching."

Timber specimens of over twenty kinds of these trees were exhibited, and the resins, gums, oils, barks, and other products obtained from them are almost too numerous to mention. Some of the vernacular names are as follows:—Red gum, blue gum, white gum, iron bark, stringy bark, box, messmate, woolly-butt, black-butt, blackwood, manna gum, Swan River mahogany, &c.

The lecturer described several of these products and their uses, and then proceeded to speak of the essential oils yielded by gum-trees. Thirty-one kinds were exhibited, most of which were from the Eucalypti. The tree producing the greatest quantity is the Peppermint tree, so called on account of the supposed resemblance of the smell of the oil to the odor of peppermint. Two trees are so called, but one has the prefix of Dandenong, or narrow-leaved Peppermint-tree. Of all the samples exhibited the oil yielded by this tree, the *Eucalyptus amygdalina* appears, from its qualities as well as its abundance, to be the most important. They all appear to be fit for illuminating purposes in a very high degree, and for varnishes and perfumery; and they may, at least some of them, be useful in medicine. The oil of the Dandenong, or narrow-leaved Peppermint, is stated to be a thin transparent fluid of a pale yellow color, possessed of a pungent odor like that of oil of lemons, but coarser and stronger.

The properties of the oil were here described, and, with regard to its illuminating properties, Mr. Redford stated that it was not inflammable when brought in contact with flame until quite hot; but it burns with a white bright light in a kerosene lamp. Compared with the flame of American kerosene, it has not quite so much illuminating power, and the light is rather yellow in comparison. This observation does not apply, however, to specimens obtained from Ballarat, which, as well as nine other kinds from the gum-trees, and five from Melaleucas or tea trees, gave a superior light, and very white in comparison. A great number of substances—gums, resins, etc.—are very solu-

ble in this oil. Particulars were here given with regard to the solubility of various substances in the oil.

It does not appear that these oils are as yet commercially available. What has yet been done must be looked upon as principally tentative of their availability and nature. The process by which the oil is obtained seems most simple and inexpensive. Mr. Redford here made some remarks respecting the production of the oil at a sufficiently low cost, from which it appeared there was a chance of gum-leaves running short. He further stated that this objection has less weight in relation to another of these oils produced from the Mallee scrub, *Eucalyptus oleosa*. The extent of country covered by this scrub in Victoria is stated to be 5,560,000 acres, but the yield of oil is not so large as that of the Dandenong, being only 20 oz. from 100 lbs. (from the Dandenong 3 imperial pints per 100 lbs. of leaves are obtained). The Jurors looked upon this oil (the oil of *Eucalyptus oleosa*) as undoubtedly the first in importance, as the supply of the raw material could be maintained from day to day, as required for distillation, almost without limit.

Several other essential-oil specimens were also described. The Melaleucas, or tea-trees, were next mentioned, and descriptions given of the *M. squarrosa*, *M. linarifolia*, *M. Leucadendron* and some other trees of the same species. The Sassafras tree, *Atherosperma moschata*, of the Order *Atherospermaceæ*, is now considered a very important one as a valuable addition to the Materia Medica, as its bark contains an essential oil, obtainable by distillation, which acts with considerable power upon the vital functions. The manufacture of the oil of native sassafras is conducted with regularity and success, and the oil is sold for 15s. per ounce.

The physiological effects of this oil being the most important, I shall only refer to them. It appears to have come into general use in the hospitals, not only as being diaphoretic and diuretic like our sassafras, but as a sedative and having a specific lowering action upon the heart. In large quantities it is no doubt highly poisonous. The dose is one drop every 6 or 8 hours. Some further remarks were made concerning the properties of the bark of this *Atherosperma moschata*, and it appears that an infusion of it is sometimes used in the remote parts of the colony

as a substitute for tea. A new alkaloid, called Atherospermine, has also been obtained from it by M. Zeyer, of Munich.

Another plant likely to be of great value is the *Pittosporum undulatum*, the blossoms of which yield an essential oil of an extremely agreeable odor, resembling the perfume of the Jessamine flowers; and when we remember that no essential oil of true jessamine, as I believe, has been obtained in quantity beyond a mere curiosity, having a fancy value of about 6 guineas per ounce, if I remember rightly, then the usefulness of such a substitute will at once appear. The leaves of this plant also yield a very bitter extractive matter.

The Santalums were next mentioned; one of them is the *Santalum acuminatum*, which yields the native or Quandang peach, which makes excellent preserves. Another is the *Santalum persicarium*, or Sandel-wood.

Mr. Redford also remarked that it deserved recording that the gum-leaves had been applied to another and rather novel purpose. In October, 1837, Mr. G. W. Prangst, some of whose products we have now before us, obtained a patent in the colony "for obtaining by distillation, from the several varieties of gum-leaves,—first, a spirit-oleaginous compound, or crude oil; and secondly, carburetted hydrogen-gas, pyroligneous acid, and tar."

This patent gas was successfully manufactured at Kyneton,—a township some distance from Melbourne, which was lighted for two years with the gas. The quantity obtained from a ton of leaves was from 9,000 to 10,000 cubic feet,—a larger yield by far than that from wood, and of a greater illuminating power. But it seems that the patentee was obliged to resort to an admixture of cannel coal at the Kyneton Gasworks, to bring it up to the required standard, and ultimately, on account of the difficulty of procuring gum leaves, to use cannel alone.

I must now pass on to the resins. Of true resins there are two kinds: that from the trees called respectively Mountain Cypress Pine, or *Callitris cupressiformis*, and Desert Cypress Pine, or *Callitris verrucosa*; the other from the grass-tree, or *Xanthorrhoea Australis*. Both those resins were described, and with regard to the latter, Mr. Redford remarked that it seemed to have some resemblance to Gum Benzoin, and also to Dragon's Blood. It is very soluble in alcohol, and in Eucalyptic oils.

Ether takes up but little, and turpentine and the drying-oils take up very little. It was critically examined by a gentleman in Melbourne, who stated that it contains Cinnamic acid in addition to Benzoic acid, and that Picric acid was developed by the action of nitric acid upon it. The polishers of Australia use it instead of benzoin and I thought I would try its capabilities as a polish ingredient. I made so bold to use at the same time a small portion of the Australian sandric, so that my polish is composed of shellac, sandrac, Australian grass-tree gums, both kinds. The results pleased me very much; I never saw a finer polish, or one which came up so quickly.

A very interesting resin, of a fossil character, has been discovered at Brass River, in the Westport district, about 50 feet below the surface.

Immense quantities of gum-resins are frequently discovered in internal cavities of most of the gum trees.

I must not omit to speak of the Manna Gum, of which I had the honor to inform this Society previously. The Commissioners have favored us with a sample of this very interesting substance. The Eucalyptus which exudes this sweet concrete is the *Eucalyptus viminalis*, which Lindley calls *mannifera*. The taste is very sweet, and it contains a large quantity of grape-sugar, with about 5 per cent. of the substance called mannite. Its medicinal properties are almost *nil*, for while Lindley says it is less aperient than manna, my brother (who has resided a considerable time in Australia, and who has forwarded much valuable information) says you may eat a quarter of a pound of it without inconvenience, and the Jurors pronounce it of no medicinal value.

Much more that is interesting might be said on this subject, as for instance of the vine-growing and the wine samples, the fibres, arrowroots, ginger, honey of six years of age, silk, salt, and also of a dye made from a *Coccus* fed on gum-leaves; but having already exceeded a reasonable limit I will inflict no more, but trust that the want of originality in my paper will be atoned for by the interest of its details. The Australian products lately presented to the Association by the Commissioners for Victoria were exhibited, and Mr. Redford referred to many of them in his paper.

Mr. R. Evans said he had been informed by a medical gentleman that there was in the English market a gum, called the Coire gum, which was valueless in this country, but out of which the Americans were making a good thing. He had been offered it as low as 4d. a pound. It was all being purchased by the Americans, who dissolved it in the solvent oils from Australia, and made the varnish for photographers.

The Chairman said he had observed a peculiar odor about American photographic varnish, which reminded him very much of the Eucalyptic oils, but he had attributed it to oil of lavender.—*Proc. Liverpool Chem. Assoc. in Pharm. Jour. April.*

QUINIA FROM CINCHONAS GROWN IN INDIA.

Our readers will learn with much interest that quinia and cinchonia have already been extracted from the bark of cinchona trees cultivated in India. A short time since Mr. M'Ivor, the superintendent of the cinchona plantations in India, forwarded to this country a box containing specimens of cinchona bark of two years' growth, etc., from the Neilgherry Hills. These samples were transmitted to Mr. Howard for analysis, who obtained from them crystallizations of very white sulphate of quinine, as also some cinchonia, and sulphate of cinchonidia. This must be regarded as a most satisfactory result, and more especially so, as, according to Mr. Howard, the amount of alkaloids thus obtained appears to him to be quite as great as would be yielded by the bark of South American cinchonas of the same age.—*Lond. Pharm. Jour., July, 1863.*

COCHINEAL IN ASIA MINOR.

To the Editor of the Pharmaceutical Journal.

Sir,—In the neighborhood of *Oushak*, in Asia Minor, there occur immense quantities of an insect, producing, when bruised, the usual cochineal color, and resembling in every respect the insects of the *Cactus cochinillifer* of Mexico, except that they are covered with a long downy sort of hair. When dry, the

hairs may easily be removed by gentle friction. These insects feed on a species of *Cistus*, the *Cistus laurifolius* of Boissier and Balansa, a small shrub with which the district abounds.

Perhaps some of your correspondents can inform us whether any of this cochineal comes into the English market, or has attracted the attention of naturalists.

Yours, &c.,

FRED. PERTWEE.

British Hospital, Smyrna, May 21, 1863.

Lond. Pharm. Jour., July, 1863.

ON BERBERINA—CONTRIBUTIONS TO ITS HISTORY AND REVISION OF ITS FORMULA.

By J. DYSON PERRINS, F. C. S.

The objects of this paper are to announce some new sources for the alkaloid Berberina, to describe several of its salts hitherto unnoticed, and to review the formula proposed by Fleitmann.

The chemical history of berberina is somewhat remarkable, and it will not be out of place here to refer briefly to it. The first notice of this body has hitherto been attributed to Buchner and Herberger, who discovered it in *Berberis vulgaris*, in 1835. They erroneously regarded it as a weak acid, rather than as a powerful organic base, and Buchner's formula has long been abandoned. I find, however, that Chevallier and Pelletan deserve honorable mention as being the first observers of berberina; they accurately described it under the name of Zanthopierite in 1826. More recently Fleitmann* published an account of "Berberina and some of its Salts," clearly establishing its basic character, and propounding a formula replacing that which had resulted from the previous labors of Buchner. Fleitmann's formula has obtained general acceptance,† varied,

* Chem. Gaz., 1847, vol. v. p. 129; Ann. Ch. Pharm., lix. 60.

† Except by Kemp, *vide* Chem. Gaz., v. 5, p. 209, who proposed a formula which has found no support; his platinum determinations agree with Fleitmann's and my own, but most unaccountably his carbon determinations of the platinum-salt are about two per cent. higher than those of any other chemist before or since.

however, by Gerhardt, who, on theoretical grounds, proposed the addition of a single equivalent each, of hydrogen and oxygen. In addition to many of the *Berberideæ*, various other sources for this alkaloid, so remarkable for its beautiful yellow color, have been discovered—by Boedeker * in *Cocculus palmarum*, the calumba root of pharmacy, belonging to the natural order *Menispermaceæ*; by Stenhouse † in *Cælocline polycarpa*, natural order *Anonaceæ*, an African wood from Sierra Leone; by myself ‡ *Coscinium fenestratum*, natural order *Menispermaceæ*, a root from Ceylon; by myself || also in *Xanthorrhiza apiifolia*, natural order *Ranunculaceæ*, a North American plant; by Mahla § in *Hydrastis canadensis*, another of the *Ranunculaceæ*, also a North American plant, common in the United States, the rhizome of which is used in American pharmacy.

Some time before the publication of Mahla's Paper, I had noticed the occurrence of berberina in *H. canadensis*; indeed it was through that observation that I was led to make the present inquiry.

I can recommend *H. canadensis*, which may be readily obtained in this country, as an excellent and available source for berberina; it yields about four per cent. of the crude alkaloid.

In addition to the sources already named, I have now to announce the following new ones; it seems unnecessary to describe the methods employed to isolate the alkaloid—they were always founded upon its solubility in alcohol and the sparing solubility of the nitrate in solution acidulated with nitric acid.

In the Indian Museum there is a yellow dye-wood from Upper Assam, called by the native name *Woodunpar*; of this I obtained a specimen through the courtesy of Dr. J. Forbes Watson; I find that berberina constitutes its yellow-coloring principle. I regret that I have been unable to ascertain the

* Chem. Gaz., vol. vi. p. 302.

† Pharm. Journ. Trans., 1855, vol. xiv. p. 455.

‡ Phil. Mag. [4] iv. 99.

|| Pharm. Journ. Trans., 1862, vol. iii. p. 567.

§ Silliman's Journal, 1862, vol. xxxiii. p. 43.

proper botanical name; from its structure it properly belongs to the order *Menispermaceæ*.

A woody root called *Raiz de Sao Joao*, or St. John's root, from Rio Grande, I believe twice imported into this country, and of which a specimen has been kindly given to me by Daniel Hanbury, Esq., F. L. S., etc., abounds in berberina; in this instance also I am unable to give the botanical designation. I gladly avail myself of this opportunity of expressing my sense of the kind assistance I have received from my friend Mr. Hanbury in the course of this inquiry. Amongst numerous rare specimens this gentleman has favored me with, is a yellow bark from the Botanical Museum at Kew, of which little appears to be known; it is simply named "*Pachnelo tree—yellow dye—Bogota.*" This bark I find to be very rich in berberina, of which it yielded nearly seven per cent. of its weight. If further inquiry should show that pachnelo-trees are plentiful in New Granada or other districts in South America, a most valuable source for berberina will be secured.

The next source for this alkaloid which I have to announce is one of considerable interest; it is the root of *Coptis Teeta* or *Mahmira*, a Ranunculaceous plant of Hindostan and China, highly prized on account of its tonic properties, and known in the bazaars of India as *Mishmee bitter*. There is an historical notice of this root from the pen of the late Dr. Pereira.* He regards as probable that *Coptis Teeta* is a remedy of great antiquity—in fact, a classical medicine, used in ancient Greece, and described by certain Greek and Arabian authors; in more recent times known in Europe under another name, but its origin not suspected. The first accurate notice of the root by any modern writer was given by Dr. Wallich, from whose account I quote:—"Mishme Teeta is the name by which the drug is designated among the Mishnees and Lamas in the mountainous regions bordering upon Upper Assam. The Chinese call it *Honglane*; among these three nations it is in great estimation and universal use as a powerful tonic and stomachic. Quantities are sent down to Assam in neat little baskets, with open meshes made of narrow strips of rattan or some such material, and measuring three to four inches in length by two and a half in

* Pharm. Journ. Trans., 1851, vol. xi. p. 294.

breadth. Each basket contains about an ounce of small pieces of the root from one to three inches long; they are nearly cylindric, uneven, scabrous, more or less curved, of a greyish-brown color, and varying in thickness from the size of a crow-quill to double that diameter. The root is perfectly dry and brittle; occasionally a few fibrillæ are issuing from one end; the inside is hard, somewhat cellular, the outside of a dingy yellow color. The taste is intensely and purely bitter, very lasting, and with only a very slight aroma. On mastication, the root tinges the saliva yellow or gold-colored: it possesses no smell whatever."

This account well describes a quantity of the root which I received from the East India Museum, through the kindness of Dr. J. Forbes Watson. I soon ascertained that the active principle of *Coptis Teeta* is berberina, in which the root abounds. I obtained from it eight and a half per cent., which is the largest amount yet met with, nor will it probably ever be surpassed. I did not obtain any other crystalline substance from this root.

Lastly, I have succeeded in establishing the fact that Zanthopierite, obtained from *Zanthoxylum Clava Herculis*, by Chevallier and Pelletan,* in 1820, is no other substance than berberina, and that consequently they must be considered as the first observers of this body.† My friend Mr. Hanbury again assisted my inquiry by furnishing me with some of the bark of

* Journ. de Chimie Med., 1826, vol. ii. 314: Note sur le *Zanthoxylum des Caraïbes* ou *Clavaler des Antilles*, par MM. Chevallier et Gabriel Pelletan. This bark is used in the West Indies as a febrifuge.

† Note by Professor Bentley.—In a paper published in the March number of the 'Pharmaceutical Journal,' I stated that the peculiar crystallizable principle found by Dr. Staples in the bark of *Xanthoxylon fraxineum*, and termed by him *xanthoxyline*, had been commonly regarded as identical with the bitter crystalline principle *xanthopierite*, discovered by Chevallier and Pelletan in the bark of another species of *Xanthoxylon*; and as Mr. Perrins had proved the identity of the latter principle with berberina, I was led to infer, naturally, that xanthoxyline and berberina were also identical. Mr. Perrins who is so well known for his researches on berberina, has since written to inform me that xanthoxyline and xanthopierite are "totally distinct," and that xanthoxyline "has no resemblance whatever to berberina." Mr. Perrins also states that he could find no berberina in the bark of *Xanthoxylon fraxineum*.

Z. Clava-Herculis. According to Dr. Julius Martiny, a German pharmacologist of eminence, this bark is somewhat peculiar, from its highly laminated texture, splitting readily into thin plates like garden bast; this is noticed by the French authors, and altogether the careful description they give exactly applies to the bark which I have examined. The botanical synonyms are *Z. Clava-Herculis*, Linn.; *Z. Carolinianum*, Gaertner; and *Z. Caribæum*, Lamarek. It is quite necessary to particularize this, in order to prevent the confusion consequent upon the last-named botanist applying the specific term *Z. Clava-Herculis* to a tree which is totally distinct.

The French chemists do not appear to have attempted the ultimate analysis of their zanthopicrite, but they have carefully noted several of its properties and reactions, not omitting the somewhat unusual deportment of this body with sulphide of potassium. My own results have clearly proved the identity of zanthopicrite and berberina. *Z. Clava-Herculis* belongs to the natural order *Rutaceæ*, and furnishes the first recorded example of berberina being a product of any plant of that order.

I now proceed to detail the numerical results I have obtained. It seems unnecessary to state in each case from which plant I have prepared the salt for analysis; suffice it to say, that the whole of the sources now first announced are included.

It is not without some hesitation that I allow myself to question the conclusion of chemists of the eminence of Fleitmann, Boedeker, and others; but my own results are so accordant with each other, the number of analyses I have made, and the variety of combinations I have examined, are so considerable, that I feel not only justified in proposing an alteration of the formula, but indeed compelled to do so. Perhaps my hesitation is lessened by the recollection that, on a former occasion, I acquiesced in Fleitmann's formula, and even supposed that it was confirmed by my analysis of the hydrochlorate, and by a platinum determination; but later experience has shown me that the hydrochlorate is not suited for ultimate analysis, as by pretty long exposure to a temperature of 100° C., or thereabouts, it undergoes some decomposition, the color changes permanently, and much of it becomes readily soluble in cold water, yielding a red solution; in these respects it differs from

the undried salt, thus proving that some alteration by heat has taken place. The pure alkaloid itself is equally unsuited for analysis, and for similar reasons, indeed, I find it not easily prepared in a state of purity. With regard to the platinum determinations of some previous chemists, it is evident that impure products have been examined. I find that very many crystallizations are necessary before any of the salts of berberina can be pronounced pure. I must also state that the numerical results of Fleitmann agree with mine in many cases, and support the formula I propose rather than his own.

Fleitmann's formula is $C_{42}H_{18}NO_9$.^{*} A glance at these numbers will suggest great doubts of their accuracy, the number of oxygen equivalents, and the sum of those of hydrogen and nitrogen, being indivisible by two; Gerhardt observed this, and proposed to represent berberina by $C_{42}H_{19}NO_{10}$? His alteration has the effect of increasing the atomic weight, which my results point out as being already too high. The formula I propose is $C_{40}H_{17}NO_8$, which, with Gerhardt's, is equally free from theoretical objection, and I hope to show that it is fully borne out by abundant analytical proof.

As the platinum salt possesses many advantages for determining the composition of the alkaloid, I have from time to time examined it. It may be prepared with ease in a pure state, in consequence of its great insolubility; like every other combination of berberina, it may be obtained in minute crystalline needles by precipitating a hot dilute solution of any berberina salt with bichloride of platinum. When collected, the precipitate should be washed with cold water until the washings, upon the addition of iodide of potassium, give no evidence of the presence of platinum; it may then be dried at once in the water-oven without any fear of decomposition, and it burns without difficulty.

The author gives the results of several analyses of chloroplatinate of berberina leading to the formula $C_{40}H_{17}NO_8HCl.PtCl_2$.

Chloroaurate of Berberina.

This combination was examined as possessing an advantage

^{*} C = 6, O = 8; for the sake of comparison, these values will be retained through this paper.

even over the platinum-salt for the object in view, owing to the high combining weight of gold.

On adding terchloride of gold to the hydrochlorate or other salt of berberina, the double gold-salt immediately falls as an amorphous brown-colored precipitate, quite insoluble in water; it is purified for analysis by washing with water, and dissolving in boiling dilute spirit, from which it crystallizes on cooling in chestnut-brown needles, which may be dried at 100° C. without decomposition; it burns with difficulty.

Analysis gave results leading to the following formula:— $C_{40}H_{17}NO_8.HCl.AuCl_3$.

The next combination to be described is interesting, as belonging to a class that I do not remember to have seen noticed before—viz., the double hyposulphites of silver and the alkaloids.

Hyposulphite of Berberina and Silver is precipitated in a yellow amorphous pulverulent form, when to a cold neutral solution of a salt of berberina is added hyposulphite of soda, saturated, or nearly so, with any silver-salt. The precipitant may be prepared by adding nitrate of silver to solution of hyposulphite of soda, so long as the precipitate first formed is redissolved; it must be filtered and used while fresh, as in time the silver is gradually deposited as sulphide.

The double berberina-salt is insoluble in water, but readily so in spirit, and in solution of hyposulphite of soda; it is decomposed by ebullition, with separation of sulphide of silver. To prepare the salt for analysis, I add the argentine solution to nitrate of berberina dissolved in weak spirit, while hot; the double salt crystallizes out on cooling in minute prisms of a pure lemon-yellow color; they are readily washed with water, and the air-dried salt does not decompose or alter in color at 100° C. Upon careful and prolonged ignition, nothing is left but perfectly white metallic silver.

The analysis of this salt leads to the formula $C_{40}H_{17}NO_8.HO.S_2O_2.AgO.S_2O_2$.

Bichromate of Berberina.—This salt has been described by Fleitmann as an amorphous substance. I have to remark that it may be obtained in orange-yellow needles by adding bichromate of potassia to a boiling and very dilute solution of a salt

of berberina—the crystals separate entirely on cooling. This salt is extremely insoluble in excess of the precipitant and in cold water, but it may be recrystallized from a large quantity of hot water. It burns readily, and the green oxide of chromium may thus be determined with exactitude. This salt agrees in constitution with the bichromates of ammonia, lepidine, chinoline, etc., in containing only one atom of water.

The following formula is deduced from the analysis:—
 $C_{40}H_{17}NO_8HO, 2CrO_8.$

The following salts were also submitted to analysis, and the formulæ given deduced therefrom:—

Nitrate of Berberina, $C_{40}H_{17}NO_8.HNO_6,$

Hydrobromate of Berberina, $C_{40}H_{17}NO_8.HBr.3aq.$

Hydriodate of Berberina, $C_{40}H_{17}NO_8.HI.$

I have now to describe a remarkable compound of iodine with berberina, having certain analogies with the quinine-salt termed herapathite. When dilute solution of iodine in iodide of potassium is added to solution of any salt of berberina in hot spirit, *carefully avoiding an excess of iodine*, the new substance speedily makes its appearance in the form of brilliant green spangles, which increase in quantity as the solution cools; they are invariably accompanied by crystals of hydriodate of berberina, or by the red salt last described, nor have I been able to devise any method of preparation by which this admixture can be wholly prevented. The formation of this new body is an excellent test for the presence of berberina; minute quantities may be detected by this reaction. Its occurrence seems to be determined whenever tincture of iodine containing hydriodic acid is added to solution of any salt of berberina in hot weak spirit, scrupulously avoiding excess of iodine; rapid agitation appears to promote its formation, and the presence of any impurity to interfere with it. Like herapathite, it bears a strong resemblance to particles of the clytra of cantharides, and to murexide; under the microscope it is seen to consist of crystals of a variety of forms, but I believe all derived from a rhombic prism; the larger crystals are wholly opaque; many of the smaller ones, however, are sufficiently thin to allow of the passage of light, which assumes a red-brown hue, sometimes inclining to violet; but the light is perfectly polarized;

in this respect also resembling herapathite, with which its optical properties are obviously similar.

I obtained this compound with the smallest admixture of hydriodate, and in the largest crystals, by heating in a strong bottle, solution of berberina in alcohol of 90 per cent., with addition of iodide of ethyl, to $100^{\circ}\text{C}.$; upon cooling, the bottle contains crystals of hydriodate of berberina, but if exposed to full sunshine for one or two hours, the crystals pass into the green salt now under notice. When the change appears to be complete, the bottle must be removed from the sunshine, or else the crystals will further pass into the red-iodine salt last described. Exposure to diffused daylight for some days may be substituted for sunshine; but, with every precaution, I have not been able to obtain the substance free from foreign crystals. It is not easy to see why this iodide of ethyl process succeeds better than others; probably the gradual development of free iodine is important. By this method I have obtained crystalline plates one-fifth of an inch in length, by about half that breadth—of course, perfectly opaque. When removed from the solution, and well washed with weak spirit, to remove adhering iodine, they have a blackish-green color with a fine metallic lustre, yielding a nearly black powder, which does not decompose at $100^{\circ}\text{C}.$

Berberina evidently occupies a position among the vegetal alkaloids of great interest in a scientific point of view—a position far more prominent than has hitherto been assigned to it; if noticed at all in our manuals, it is dismissed in half-a-dozen lines. From inquiries, which can be termed little more than superficial, its occurrence has been shown in numerous plants, belonging to no less than five of the great vegetal families,—the natural orders of the botanist,—nor can it be doubted that many other sources yet remain to be discovered; its geographical distribution, even in the present state of our knowledge, is all but universal; it is to be found in almost every country, certainly in every climate, and in these respects it claims precedence over all the other alkaloids.

As regards its usefulness to man, I believe its importance is not yet fully recognized. Though it has been long used as a fine yellow dye, more especially for animal tissues, its chief claims to

usefulness do not reside in its application to the economic arts—doubtless its therapeutic effects merit much careful investigation. Natural instinct has pointed out its value, for the alleviation of human sufferings, to nations widely separated and enjoying different degrees of civilization. The polished Greeks, the semi-barbarous nations of Hindostan and China, the North-American Indians, and the natives of tropical Africa, have been all impressed with the medicinal value of berberina. In the West India Islands and in American pharmacy its virtues have long been recognized, though derived from different plants, and veiled under erroneous names; certainly, it holds a place in European pharmacy but one of little prominence, yet it seems to possess properties scarcely inferior to quinine itself. Various medical writers have insisted upon its advantages as a remedial agent; their arguments it would be out of place here to recapitulate, but I am persuaded that nature has not placed berberina in nearly every country without some adequate purpose; there are evidences that its value is becoming better understood amongst ourselves, and I confidently anticipate that ere long its reputation will be greatly increased.—*Abridged from the Journal of the Chemical Society.*

ON THE SOLUBILITY OF SULPHATE OF LIME IN CHLOROHYDRIC ACID.

By S. W. JOHNSON, New Haven, U. S.

In this laboratory it has long been the custom to bring into solution for analytical purposes gypsum, so-called superphosphate of lime, and other substances containing much sulphate of lime, by treatment with hot dilute chlorhydric acid. The action is rapid, and the analysis may be carried on with more convenience than when decomposition is effected by carbonate of soda. The sulphate of lime is not taken up by very concentrated chlorhydric acid to nearly the same extent as when the acid is dilute, and therefore a saturated solution of the salt in the latter is copiously precipitated by the addition of fuming chlorohydric acid as well as that by water.—*Lond. Chem. News, May, 1863.*

Varieties.

On the Substitution of Soluble Glass for the Resinous Soap used in the Manufacture of Ordinary Soap. By Mr. FR. STORER.—In many countries, but especially in America, enormous quantities of colophony have long been used in making hard brown or yellow soap. These compound soaps are very useful, and in point of cheapness no other soap can compete with resinous soap. The civil war in America, by causing the blockade of the slave States, whence most of the rosin is derived, has induced an extraordinary rise in the price of colophony, so that the further manufacture of cheap soaps seemed for the time arrested.

The attention of soap makers is then directed to the preparation of soaps containing silicate of soda.

The idea of employing soluble glass is by no means new. Its application to this purpose was long ago proposed and patented by M. Wilson, followed by MM. Sheridan, Gossage, and others. It seems to have been recently taken up anew in England. But the American process differs notably from those previously in use, by making use of a product rich in silica, capable of forming a hard and comparatively neutral soap, instead of the extremely alkaline mixture of the above-mentioned inventors.

This constitutes another example of the rapidity with which one industrial process displaces another, previously preferred, but whose further development is impeded by circumstances.

The American process commences in preparing by the dry way a silicate of soda containing five equivalents of silica and two of soda, which is dissolved by prolonged boiling in water. The solution is sometimes hastened by pressure.

The limpid solution, freed from all insoluble impurities, is decanted and concentrated to about 35° B., 1.32 specific gravity being the state in which it is sold.

After preparing by the usual process a certain quantity of pure soap with tallow, oil, or other kind of grease, and when the boiling is just finished, it is poured, while still hot and in a fluid state, into forms or moulds, and the desired quantity of concentrated solution of silicate of soda, either cold or heated, is added at the same instant. To incorporate the silicate thoroughly, the mass is stirred, until the cooling renders this operation difficult. It is then left to harden. By this process the silicate

of soda becomes so perfectly incorporated with the soap that as much as 60 per cent. of this solution at 35° B. may be added, and yet yield a soap of adequate consistency. But generally not more than from 25 to 40 per cent. of silicate is added to the soap.

It is this power of adding so large a proportion of alkaline silicate thoroughly saturated with silica which forms one of the great advantages of the American process. According to M. Steeber's experiments (Wagner, *Chim. Tech.*, p. 123), it is possible to mix only small quantities of the more alkaline silicates, such as were formerly used, with hard tallow or oil soaps, for when more is added the excess separates.

The experience of some American soapmakers who have recently tried to introduce 32 per cent. silicate of soda into their soaps, confirms M. Seeber's opinion.

Soap prepared by the American process differs materially from ordinary rosin soap neither in appearance nor action. It has passed satisfactorily through the trial of a great demand during the past year, and appears to serve perfectly well for all the uses to which ordinary soap is applied. The American Government has already bought large quantities of it for the use of the army at a much lower price than was formerly given for resinous soaps, and it has undergone all the tests exacted by the agents of the Federal Government.

We may remark that a mixture of silicate of soda and ordinary soap has been preferably used for some time in washing woollen fabrics in one of the largest establishments of the United States.

Silicate of soda is useful to soapmakers for several qualities not possessed by rosin; for instance, the addition of a large quantity of silicate of soda imparts to the soap neither that disagreeable odor nor the glueiness which too great a proportion of rosin communicates. It may be introduced into soap in much larger proportions than rosin without in any way injuring the sale of the product.

It is not probable that rosin will ever resume its former importance to the soapmaker. It will still be used conjointly with the silicate of soda, since a little rosin serves to correct the nauseating odors of inferior fats, and because, according to some makers, it augments the deterative action of the soap.

The use of soluble glass in hard soaps should not be confounded with the use as detergents of simple solutions of silicate of soda, as described by M. Kopp in the *Répertoire*, vol. i., p. 193. The latter are simply alkaline solutions, similar to those of alkaline carbonates. They act chiefly, if not wholly, by their chemical nature, for they do not lather, and in that and other respects are unlike real soaps; while the silicate of soda soap, owing to the portion of fatty acid it contains, lathers abundantly, and behaves like ordinary soap, the mechanical and chemical conditions required by a good soap being fulfilled.

It should be borne in mind that silicate of soda soap is distinct from siliciferous soaps formerly prepared by the mechanical addition of silica or of some insoluble silicate, such as silicate of alumina, which is simply a useless adulteration, while in soaps containing soluble glass a portion of fatty acid, so to speak, is replaced by a weak mineral acid, equally efficacious in modifying the causticity of the alkali.

These silicate soaps must not be confounded with the "Marseilles soap," which, when genuine, is still the soap *par excellence*. I am far from thinking that the silicate of soda produces soap equal to that made strictly from fatty bodies.—*Chemical News, London, July 11, 1863.*

Pressure at the Bottom of the Atlantic.—Several experiments have been tried during the last few days, at the Wharf-road, to determine what effect the pressure of the Atlantic sea has upon a submarine cable laying on its bottom at a depth of $2\frac{1}{4}$ miles. The experiments were made in Reid's large press, capable of resisting a pressure of above 10,000 lbs. on the square inch. The specimen of cable used is known as the Persian Gulf standard, having a coating of gutta-percha $\frac{3}{8}$ of an inch in diameter. It was subjected to a pressure equal to two miles and one quarter of a mile deep, and the pressure kept on for one hour, first having been carefully tested by what is known as Professor Thompson's reflecting galvanometer.

Some people who call themselves electricians were of opinion that this enormous pressure—about 5,000 lbs. on the square inch—would force the water into the copper core, and by this means deteriorate the cable, if not quite destroy it.

These experiments have completely demolished this theory. On the contrary, when the pressure was removed, the cable was found to be considerably improved, and gave with the same instrument several degrees of improvement. These experiments will be continued during the course of next week, upon a more extended scale, and carefully recorded.

At the present time several gentlemen wished to ascertain the truth of an old anecdote current at sea, that was said to be performed by an old salt, viz: he sunk a bottle of wine to a great depth in the Atlantic, securely corked, and when pulled up all the wine had disappeared and was replaced by salt water. Another story of the same kind has been long in circulation—that if you take an empty bottle, securely corked, and sink it to a great depth, it will come up filled with salt water, while the cork remains undisturbed.

In order to test the first of these theories, six quart bottles of Bass' pale ale were submerged, securely corked and wired down, then covered with Betts' patent capsules; there were also several bottles of lemonade and ginger-beer, all properly secured in the same way.

To test the second theory of the empty bottle, one was securely

corked and wired, one was corked after another fashion, having a large knob left on the cork in the form of a champagne cork, to prevent it being driven in. The third bottle had a wood cylinder put inside, resting on the bottom, and reaching the cork, to give another form of resistance to the cork. The pressure was the same as before, and the time under pressure the same, viz., one hour.

The results were as follows:—The Bass's ale came out all sound and good, the same with the lemonade and ginger-beer. The small space left by the bottler between the cork and the liquor was filled up. With this exception all was the same. The first empty bottle the cork was driven in, and as a matter of course the bottle came up filled with water. The second bottle with the large knob was also driven in, and the bottle came up full. The third, that had the wooden cylinder inside, on which the cork rested, was driven in to a certain extent, not whole, and this bottle came up also full, showing that at these great depths no corking, however secure, will prevent the water from getting into an empty bottle, and when you send the bottle down filled and well corked, there is no danger of the liquor making its escape and being filled with another; so that the sailor must have drank the wine first, and sent the empty bottle down afterwards.

Another interesting experiment was tried to test the accuracy of Dr. Wallich's statements as regards living creatures at great depths in the ocean.

It is a generally received opinion that no living creature exists at the bottom of the Atlantic—that in these dark and silent regions of the great deep eternal silence and solitude reign, the bottom being a fine deposit of diatomates too minute for the naked eye of man.

To demonstrate this, some live carp, lobsters, eels, &c., were put in the cylinder; the same pressure (Atlantic depth) and the same time—one hour. The whole perished, and came out quite stiff, thus proving that the general opinion on this subject is correct, and that Dr. Wallich's statement wants confirmation.—*Chemical News, London, July 25, 1863, from Engineer.*

Recovery of Gold from Cyanide Solutions. By R. Huber.—The author gives the following as a quick and cheap process for reducing gold from inactive gilding solutions:—

The liquid is first supersaturated with hydrochloric acid, and heated to boiling, on which a yellowish-green precipitate separates with the development of cyanic and carbonic acids. Some of the cyanide of gold remains in solution, the greater part of which, however, will separate on cooling. After separation from the deposit by filtration, the solution is heated again, some zinc, and, if necessary, more hydrochloric acid being added. In an hour or two the whole of the gold will be found reduced. The liquor is now poured off, and the precipitate boiled once more with

hydrochloric acid. It is then washed and added to the other precipitates. The mixed precipitates, after drying, are ignited in a platinum crucible and then fused with an equal weight of acid sulphate of potash. When cold, the fused mass is boiled with strong sulphuric acid, the liquor is poured away, and the now perfectly pure gold is well washed with hot water. A cast iron crucible may be used for the fusion instead of a platinum, but in that case the gold must be boiled with strong hydrochloric acid to remove the iron.—*Chem. News, London, July 18, 1863, from Dingler's Polytech. Journal.*

Strength of the Fibres of Orleans Cotton.—Mr. Charles O'Neill exhibited a mounted fibre of Orleans cotton, torn by a gradually increasing weight suspended to its extremity. It had sustained a weight (gradually increased) of 162 grains for many minutes. Mr. O'Neill stated that there were 143 such fibres in .01 grain of cotton, each fibre therefore weighing less than the ten-thousandth part of a grain. The strongest fibres were capable of supporting more than two million times their own weight. He is engaged in making experiments upon the tensile strengths of various fibres by a special apparatus, but they are not yet completed.—*Jour. Fr. Inst., from Proc. Manch. Lit. and Phil. Soc., March 16, 1863.*

Saracenia purpurea in Smallpox.—Doctors differ more than ever as to the value of the reputed remedy for smallpox which was so fully described in our January number. Surgeon-Major Cosmo G. Logie, of the Horse Guards, states that he has given *Saracenia purpurea* successfully in eleven cases of the disease, the patients having rapidly recovered under its peculiar influence. "This remedy," he writes, "I consider a boon to the public, for this reason—it is so easily managed; any one can make a decoction or infusion of the root, like tea. An ounce of the root is sliced and infused in a quart of water and allowed to simmer down to a pint, and given in two-tablespoonful doses every few hours, while the patient is well nourished with beef-tea and arrowroot. Four of the cases in my hospital have been severe confluent cases; they have throughout the disease all been perfectly sensible, have had excellent appetites, been free from pain, and have never felt weak. The effects of this medicine, which I have carefully watched, seemed to arrest the development of pustules, killing, as it were, the virus from within, thereby changing the character of the disease, and doing away with the cause of pitting (if I may so express myself to the uninitiated), and thus avoiding the necessity of gutta-percha and india-rubber applications, or of opening the pustules. In my opinion, all anticipation of disfigurement from pitting may now be calmed, if this medicine is given from the commencement of the disease. Before leaving this subject, I may here caution the public that the useful part of the plant is its root, as recommended by Dr. Miles, and it can only be

obtained from Messrs. Savory and Moore, to whose house alone it has been imported."

Dr. Dudfield, of Kensington, believes that Mr. Logie has given the drug credit for effects which really proceed from vaccination. Referring to the passage we have quoted above, this physician writes—

"This description, so far as it goes, agrees with the course of many cases of smallpox occurring in vaccinated persons (modified smallpox), in whom there is generally no 'pitting.' I am therefore tempted to inquire whether the subjects of these eleven cases had ever been vaccinated? I have myself little doubt they had, and I incline to the belief that the modification of the disease was due rather to that circumstance than to any influence possessed by the *Saracenia purpurea*, a 'remedy' which has been largely used by some other practitioners, and by them stated to possess no 'peculiar' or any other influence over the progress of smallpox."—*Chemist and Druggist*, July 15, 1863.

Acetic Acid and its Homologs in Wine.—M. Bechamp* has observed that even new wine which has been fermented out of contact with the atmosphere, always yielded an acid liquid on distillation. He obtained from wine about 0.4 per cent. of soda acetate, and by fermenting sugar in an atmosphere of carbonic acid he obtained a mixture of acetate and salts of fatty acids in small amount, the solution of which gelatinized when evaporated to the point of crystallization, and after a time yielded crystals of soda acetate, amounting to about 35 per cent. of the sugar fermented.

M. Bechamp considers that the acetic acid is not merely the result of the oxidation of alcohol, but that it, and the homologous acids accompanying it, are produced by fermentation. In support of this view, he refers to Lavoisier's observation,† that the product of the fermentation of sugar contained acetic acid.

M. Pasteur,‡ commenting on this opinion, points out the probability that the acids which have long been known to exist in fermented liquors are the result of alteration of the ferment, and do not originate from sugar. For this reason he has not included them among the products of alcoholic fermentation. The presence of acetic acid observed in fermented liquids, he considers to be merely accidental, and due either to the special conditions which are determined by the growth of a mycoderma, or to the action of a specific ferment, different from the alcoholic ferment.

Though, under ordinary circumstances, acetic acid and its homologs are always recognisable in alcoholic liquids, this is not the case with liquids fermented with alcoholic ferment, which do not give any indication of the

* Comptes-Rendus, lvi., 969; † Traite de Chemie, i., 147; ‡ Comptes-Rendus, lvi., 989.

presence of those acids, however carefully they may be evaporated, either by the smell or by reaction upon test-paper.

As to the source of these acids, M. Pasteur is still undecided, and he regards the determination of this point as one of the desiderata of his researches on the subject of fermentation.—*London Chem. News*, June 20, 1863.

New Silk Moth.—The introduction of a new Silk Moth (*Bombyx Cynthia*) into Europe bids fair to be of great importance. It was first sent from China to Turin by a Piedmontese missionary in 1857, and so early as 1858 it had attracted the attention of Guérin-Meneville at Paris, so far as to induce him to plant 5000 trees of *Ailanthus glandulosa*, on the leaves of which the caterpillar feeds. It is reported that the almost incredible quantity of 100 millions of trees are now planted in France for the sustenance of the caterpillar, insomuch that Guérin-Meneville has said that "Henry IV. gave us silk for the rich, but Napoleon III. has given silk to the poor."

We believe, indeed, with every reader of 'Quentin Durward,'* that silk was produced in France long before the reign of Henry IV.; but however this may be, the produce of *Bombyx Cynthia* is of a far coarser and more durable nature than ordinary silk. In China it forms the greater part of the material of which the clothing of the middle-class is made, and is so durable that a garment descends from parent to child, besides having the valuable qualities of never contracting grease spots, and being waterproof.

So useful an article of commerce, the culture of which had already extended from Italy to France, Switzerland, and Belgium, could scarcely help attracting the attention of Austria, where there is such a variety of soil and climate, suited in some locality or other for almost everything which can be employed to any useful purpose in art or manufacture, provided it does not require tropical heat. Experiments were accordingly made at Trieste and Götz in raising the new silkworm, and apparently with some success. It was, however, desirable to ascertain whether there was any promise for more northern latitudes. Accordingly a manufacturer of the name of Fichtner, at Atzgersdorf, at a short distance from Vienna, on the borders of the river March, a tributary of the Danube from the north, has taken the matter in hand, and has laid before the Trade Union of Lower Austria, on the 17th of October, 1862, an account of his experiments, of which we now have an abstract before us.

One great advantage attending the culture consists in the fact that unlike the common silkworm, the *Ailanthus* caterpillar requires scarcely any care, if a single harvest only is desired. If, however, two or more are sought

*Louis XI. is there spoken of as the great silk-merchant and cultivator of Mulberry-trees, under the name of Maitre Pierre.

for, the eggs must be hatched artificially, and the caterpillars fed on the leaves of *Dipsacus fullonum*, or artificially forced *Ailanthus*, till the leaves are expanded in the open air. At present great difficulty has been experienced in running off the silk from the cocoon, and in consequence the process of carding must be employed, which is wasteful, besides yielding a kind of silk resembling wool rather than common silk. But even here there is one advantage, viz. that the cocoon is far less injured when the moth makes its appearance than in that of the old silkworm.

All that is necessary where a single crop only is desired, which is conceived to be the most useful plan for Austria, especially for small proprietors, the persons who are expected most to profit by the scheme, is to cover the hedge of *Ailanthus*, the most convenient form in which the plants can be grown, with a common net spread over hoops, to protect the caterpillars from the house sparrow, which is peculiarly fond of them,—a curious matter, as they are so very different from any caterpillar to which sparrows are used.*

The insect assumes the pupa state in from thirty-eight to forty days after the caterpillars first make their appearance, and in about twenty days more the moths appear. The pupæ must be placed in some convenient box lined with cotton and covered with net work for protection, in order that the eggs may not be lost, and may be conveniently removed by cutting to pieces the lining or net to which they are attached. Unfortunately the eggs retain their vitality only for a short time, and dependence therefore for the next year's crop must be placed on those pupæ which do not at once change to the imago.

Experiments have been tried in the north-eastern corner of Moravia, at the northern foot of the Carpathian Mountains, which have been equally crowned with success, a circumstance which makes it not impossible that the insects may succeed in those parts of Great Britain where the *Ailanthus* will flourish. Success indeed is more probable, as the caterpillars are not impatient of moderate changes of temperature, though as autumn advances, when the nights are cold, they will begin to spin the cocoons, but will not finish them, as they die before they can attain the state of pupæ. There is the more reason to hope that they may succeed in England, as the degree of labor which they require is so small as not to make it a serious item of expense.

At present, the experience is of so short a date in Germany that it is quite premature to speak of the relative expense of production and profit. Herr Fichtner, however, is sanguine that without detracting much from other objects of cultivation, the small proprietor will find his end answered in having on his few acres a hedge or two of *Ailanthus*, which will produce

*The caterpillars are at first black with yellow spots, then yellow with black spots, then white with black spots, then emerald-green with indigo spots, when they are very fat and greedily sought by the birds.

about a pound of silk for every twelve feet, the only expense being the wear and tear of the protecting net, as the small amount of labor can easily be supplied by the cottager's family.--*Lond. Phar. Journ.*, Aug. 1863, from M. J. B., in the *Gardeners' Chronicle*.

The Upas Poison.—*A dangerous experiment.*—The upas tree of Java, known to botanists as the *Upas antiar* or *Antiaris toxicaria*, produces a milky juice with which weapons are poisoned. The poisonous principle is called *antiarin*, and contains $C_{14}H_{10}O_5$. It forms small pearly crystals soluble in 27 parts of boiling water, and also in alcohol, but scarcely so in ether. Introduced in a wound, it rapidly brings on vomiting, convulsions, and death. The *Abeille Médicale* states that a short time ago a scientific gentleman at Berlin received a small quantity of the condensed juice of the upas, and resolved to try the effects of it upon himself. One afternoon he accordingly took three grains of this drug, which he found very bitter and rather saltish. Immediately afterwards he felt extremely gay, and a bad headache which he had at the time disappeared; but after a while he experienced a sensation of oppression in the stomach. Nevertheless, he had the imprudence to go out: on turning a corner he became aware of a considerable stiffness along the spine; this was about half an hour after having taken the poison. An hour later, while taking a cup of coffee, he felt a violent shock throughout his body and stiffness at the extremities; at the same time his head was thrown backwards, he lost all power of speech, but his mental faculties remained unimpaired. There was a slight remission of these symptoms for a few minutes, and then a fresh attack came on; and this continued until the patient at length succeeded in expressing a wish to be taken to the hospital of La Charité. As he was being helped downstairs to get into a carriage, a new attack impeded his progress; but during the drive he had none, although the slightest shake seemed sufficient to bring it on. These attacks were attended with but little pain; deglutition was very difficult, and the patient felt very weak. After every attack the muscular system relapsed into inertness. At the hospital, emetics were immediately administered to expel the poison if any remained; the vomiting was attended with sudden starts, spasms in the glottis, and difficulty of breathing; the latter symptom, however, soon subsided. The pulse was at 72. Thirty drops of laudanum were administered at the rate of ten for every quarter of an hour, and then thirty more, in three parts, at intervals of half an hour. The patient fell asleep, but was often awakened by the contraction of the muscles of the back and neck. Laudanum was again administered, and sleep returned. On the following morning the patient felt very weak, but only complained of stiffness in the left muscles of the neck; the pulse was at 66. Wine and light food were now given instead of medicine, and on the sixth day the patient left the hospital perfectly recovered.—*Chemist and Druggist*, May 15, 1863.

Adulteration of Quinine.—Mr. J. Brendon Curgenvin, in a letter to the ‘Dublin Medical Press,’ May 13th, states that *muriate of cinchonine* is extensively used to adulterate the disulphate of quinine, and he advises all who have quinine in their possession to ascertain by the following tests how far it is adulterated:—“Quinine is soluble in ether, but cinchonine is not; quinine mixed with water, is dissolved by adding a little chlorine water; if to this solution ammonia be added, it becomes grass-green in colour. If cinchonine be treated in the same way, the ammonia produces a white precipitate.”—*London Pharmaceutical Journal*, June, 1863.

Death from Swallowing Blue Pills.—An inquest has lately been held at Rogate on a woman named Caroline Stevens, who died from mercurial poisoning brought on by taking blue pills. It appeared from the evidence that she had once been ordered by a medical man to take a quarter of an ounce of blue pill in a month. She derived benefit from the prescription, and the next year she procured more in larger quantities, which she took till it affected her mouth. The following two years she obtained still larger quantities, and on both occasions it produced more or less salivation. She usually procured it in lumps of a chemist living at Petersfield. She thought the last time she left it off too soon. On the present occasion she procured more, and had been taking it six weeks. Dr. Peskett, who attended her, found, by directions of the deceased, in an old wardrobe, done up in a quack medicine paper, ten rolls of pills, which he produced. Each roll was $1\frac{1}{4}$ inch in length, and $1\frac{1}{8}$ inch in circumference. Deceased told him that she usually took fifteen pills twice a-day; on one occasion she took fifteen three times in one day; for several weeks not less than twice a-day. The druggist who sold her the blue pills said she had been in the habit of buying three or four ounces at a time. He sold it under the impression that she and her husband had bought the pills for the purpose of retailing them in the country.—*Ibid. from Medical Times and Gazette.*

Digestion.—Mr. Brücke, of Vienna, (*Constat's J. de Pharmacie*) has communicated to the Austrian Academy of Science an interesting paper on the influence of acids and pepsin in digestion, and on the question whether the latter is formed during that process; and also, in what manner the secretion of the digestive fluid takes place. By pepsin, Brücke understands the nondescript substance emanating from the glands of the stomach, and which, in an acid solution, has the power of dissolving all albuminous matter in the stomach as well as without it. He found by a number of careful experiments that this power is strongest in a solution of $\frac{7}{8}$ th gramme of dry hydrochloric acid in a litre of water, decreasing when the amount of acid rose above $1\frac{1}{4}$ or fell below 9-20ths of a gramme. Contrary to the generally accepted views of Mulder, that part of the albuminous matter may pass into pepsin, Brücke's experiments go to show that such is not the

case. He concludes that the stomach in an empty condition contains no acid fluid which is only secreted by the action of the nervous system when food is introduced. Dr. Ebstein (*ibid.*) communicates a series of experiments on the action of saliva upon starch. Like Louchs, Frerichs, and others, he found that starch, in contact with saliva, even in the presence of some acid, to a certain extent is converted into dextrin and sugar, and that the secretions of the stomach, though of an acid reaction, do not prevent this change. Dr. E. remarks, that while secreting the saliva necessary for his experiments, he found it advisable to abstain from smoking, which, we suppose, he otherwise considers a legitimate occupation during physiological experiments; he does not, however, suggest the same caution in regard to chewing.—*Chem. News, London, July 11, 1863.*

Editorial Department.

THE PHARMACOPOEIA OF 1860.—Many of our readers have ere this time had an opportunity of examining this long expected work, and are beginning to learn somewhat of its contents. It had been our intention to have prepared an extended notice of the Pharmacopœia for this number, but finding we could avail ourselves of the able pen of our friend Alfred B. Taylor, Secretary of the Committee of Revision, we feel relieved from making much comment at this time, reserving for future occasions a series of notices of some of the formulæ. We invite our readers to carefully examine the paper of Mr. Taylor at page 401 of this number, in which they will find a condensed view of the changes and additions which have been effected by the Committee of Revision. As a preliminary preparation to aid in thoroughly understanding the new Pharmacopœia, we earnestly suggest that apothecaries should first study carefully the preliminary notices from page 1 to page 7 of the text on weights, measures, temperature, percolation and the fineness of powders. Mr. Taylor's comments explain the importance of this, but we feel constrained to give additional testimony to the same end. The process of percolation has been so thoroughly adopted, and the value of that process depends so much on the proper fineness of the powders treated, that the reader will at once understand us when we say that these preliminary notices are the foundation upon which the Pharmacopœia is erected. As regards the use of sifted powders for percolation, a new era will have to be commenced by those Apothecaries and Druggists who have been careless in regard to the state of division of the powders used in this process, if they expect to produce the preparations intended. Because in many instances the first strong liquor is reserved and the strength of the first runnings in a process of percolation is due in great measure to the proper division of the powder.

In fact every practical pharmacist should be so familiar with the actual value of the terms "coarse," "moderately coarse," "moderately fine," "fine" and "very fine," as relates to powders, as to recognize them at once when used in a formulæ, as having positive and not general meanings.

It also occurs to us to suggest a careful reading of the *Materia Medica* lists, so as to get familiar with the new official names, with the meaning of such as are not known, with the strength of acid solutions, etc. It is greatly to be desired that physicians will make themselves acquainted with the changes and additions of the Pharmacopœia, and assist in the endeavor to make it the rule and guide that it should be to themselves as well as to the apothecaries. Especially at first let them become familiar with the changes of strength in preparations, as in Fluid Extract of Valerian and of Buchu which are double the old strength and require but half the dose.—Again, *Liquor Potassæ Citratis*, now means a Solution of Citrate of Potassa, made extemporaneously from specified quantities of Citric Acid and Bicarbonate of Potassa without any oil of Lemon or other flavoring; whilst *Mistura Potassæ Citratis* indicates the old Neutral Mixture made by saturating lemon-juice with Bicarbonate of Potassa. It is quite desirable that prescriptions should clearly indicate which of these are intended, and it would be a great help if physicians would designate which of these they want by the affix "*Pharm.* 1860" after the name, until we all become familiar with the names.

AMERICAN PHARMACEUTICAL ASSOCIATION.—By a letter from Prof. Moore, of Baltimore, we are informed that arrangements have been made by the Maryland College of Pharmacy, to hold the sessions of the American Pharmaceutical Association in the Hall of the University of Maryland, in Lombard street, near Paca street. The meeting will convene at 3 o'clock, on the afternoon of September 8th. The Eutaw House is convenient to the University, and on a former occasion was the headquarters for the visiting members. It is much to be desired that the attendance should be full, and that members should report themselves early at the place of meeting. Information relative to the place of meeting may be obtained at the drug store, opposite the Eutaw House, of Prof. J. F. Moore, corner of Howard and Madison streets, and of Mr. A. P. Sharp, corner of Pratt and Howard streets.

NEW YORK APOTHECARIES.—We observe the following series of Resolutions published by authority in the *American Medical Times* for August 29th, 1863, viz:

"*Apothecaries and their Relations to the Medical Profession.*—At a meeting of the Kings Co. Medical Society, held July 14, 1863, the attention of the Society was called to the censurable course pursued by some of the druggists of the county. It was stated by several of the members that these gentlemen were in the habit of commenting upon prescriptions

to the disparagement of physicians, substituting other articles for those prescribed, and not unfrequently renewing the prescriptions without the knowledge or consent of the attending physician, and that they were in the habit of prescribing for patients. For these, among other reasons, a committee was appointed, who made the following report, which was adopted:—

Whereas, It is eminently desirable that the art of prescribing and dispensing medicines should conform, as far as possible, to scientific accuracy; therefore,

Resolved, That the Medical Society of the County of Kings recognizes the fact that physicians should be scrupulously careful in writing their prescriptions distinctly, and that they should use, as far as practicable, official names only.

Resolved, That it is the duty of dispensing apothecaries to put up prescriptions distinctly as directed, or to reject them, excepting, however, when there is cause to suspect a mistake; in which case, it is manifestly the duty of the apothecary to assure himself of the intention of the prescriber, before dispensing the prescription.

Resolved, That the practice which some apothecaries indulge in of treating cases of disease constitutes quackery in its worst form, because of the false confidence which their semi-professional character inspires in the minds of the people.

Resolved, That recommending nostrums, prescribing, criticizing prescriptions, or otherwise indulging in conversation tending to impair confidence in the author of a prescription, substituting other articles than those directed by physicians, keeping incompetent clerks, dispensing medicines of bad quality, repeating prescriptions against the expressed wish of the prescriber, and habitual carelessness, are all disreputable practices; and it shall be the duty of the members of this Society, who may hereafter become cognisant of such conduct, to report the same to the Society for the benefit of his Fellows.

Resolved, That these resolutions and preamble be approved by the President and Secretary in behalf of the Society, and published; and that a copy of the same be presented to every apothecary in the county, if practicable.

DEWITT C. ENOS, *Prest. Kings Co. Med. Soc.*

JOHN T. YOUNG, M. D., *Sec. Kings Co. Med. Soc.*"

We have no desire to approve of any form of pharmaceutical malpractice—here or elsewhere. We agree entirely in letter and spirit with the preamble and two first resolutions. We reprobate the custom of apothecaries prescribing in the strict sense of the term; but so long as *physicians* will keep apothecary shops and prescribe at their counters—and buying pills and other medicines wholesale, will retail them to their patients, who are within reach of reliable apothecaries, they excite a spirit of competition which results in counter-prescribing. The fourth resolution is very comprehensive in its charges—and covers nearly the whole ground of pharmaceutical iniquity, and where they do occur they should surely be visited by the reprobation of every high-minded apothecary, especially such as relate to causing injury to the reputation of the physician or tampering with prescriptions. No apothecary can be justified in this, designedly; and yet so absurdly are some prescriptions put to

gether, and so carelessly are so many written, that with an earnest desire to screen the prescriber it is sometimes difficult to do it with certain persons. If the gentlemen of Kings County Medical Society, who issue these resolutions, feel themselves clear of practices which directly tend to demoralize apothecaries, and lead them to collateral and less reputable ways of gaining a livelihood, they are justified in issuing their manifesto. but unless they are, it will fall as a dead letter, or recoil on themselves.

The Physician's Visiting List, Diary, and Book of Engagements for 1864.
Philadelphia, Lindsay & Blakiston.

The Publishers have already prepared their "Visiting List" for 1864, in two sizes—for 25 and for 50 patients. The prices of the former, are according to quality, 63 cents to \$1.00, whilst the latter can be had for 75 cents and \$1.25, the more expensive copies being bound in pocket-book style.

The Forty-fifth Annual Report of the Trustees of the New York State Library, transmitted to the Legislature April 7th, 1863, Albany, 1863. pp. 129, octavo, has been received.

Braithwaite's Retrospect of Practical Medicine and Surgery, parts 46th and 47th, American Edition, New York, W. A. Townsend, 1863.

From the publisher. These numbers are enriched with much matter calculated to interest the physician and merit his attention.

OBITUARY.—DR. WILLIAM DARLINGTON.—We have received a memorial of Dr. Darlington, and intended to have made use of it for this notice, but, having mislaid it, we avail ourselves of Dr. Gray's notice in "Silliman's Journal:"

"The Nestor of American Botanists died, at his residence in West Chester, Penn., on the 23d of April last, having nearly completed the 81st year of his age. The death of this most charming and unaffectedly good man, although occurring in the fulness of time, and following close (as was meet) upon the bodily infirmities which at length arrested the serene activity of the octogenarian,—waiting, but laboring still as strength and occasion served,—is sensibly felt, not only in the town and country where he has long been honored and venerated, but also by a wide circle of friends and correspondents throughout the country and in other lands. If not a very profound, he was a most accurate and faithful botanist, one who appreciated and largely imbibed the spirit of all the great advances in botanical philosophy, and especially in morphology, which have been made in his day. His *forte* was in the clear and accurate description of plants; his desire, to make perfectly known the plants of his native county; his modest estimate of his own labors in his favorite pursuit was expressed in the motto of his *Florula Cestrice*, in 1826, and repeated in his classical *Flora Cestrice* (one of the very best local floras ever written) in 1837 and 1853: '*Ore trahit quodcunque potest, atque*

addit acervo:' his love for the familiar objects which had attracted his life-long interest was characteristically shown in the inscription which he wrote for the stone that now covers his mortal remains: '*Plantæ Cestrienses quas dilexit atque illustravit super tumulum ejus semper floreat;*' while higher feelings and sacred hopes were fittingly expressed when on receiving the first warning, of which he knew well the significance, he said to those around him, 'My work is done; and I think I can say, with Simeon of old, 'Lord, now lettest thou thy servant depart in peace.'

But, much as he cultivated Botany, this was only the side-issue, the recreation of his life, which was actively devoted to professional and various civic occupations, and to the discharge of many honorable trusts."

Dr. Darlington was born in the village of Dilworth, now called Dilworthstown, in Birmingham township, Chester County, Pennsylvania, April 28th, 1782. He was the eldest child of Edward and Hannah Darlington, and descended from ancestors, each branch of which, as far as can be traced, was an unmixed race of plain English Quakers. His early life was agricultural, but becoming disgusted with the drudgery of farm labor, as then effected, he sought a better education, and in 1800 entered the office of Dr. Vaughan, of Wilmington, Delaware. It was while pursuing his medical studies that Dr. Darlington acquired a taste for the study of languages and mastered the French tongue, and in after years the Latin, Spanish and German languages were added. It was also when attending lectures at the University of Pennsylvania that, under the teaching of Dr. Benjamin Smith Barton, he began his acquaintance with his favorite science of Botany. He graduated in 1804, and commenced the practice of medicine in his native county. We have not space to follow the events of Dr. Darlington's life, but will hurriedly state that in 1808 he married the daughter of Gen. Lacy, of New Jersey; that in 1814 he volunteered in the service of the State during the English invasion; that he was elected successively a member of the 16th and 17th Congress, and to other offices, until in 1830 he was elected to the Presidency of the Bank of Chester County, a position he retained until his death. His "*Florula Cestrica*" was published in 1826. In 1837 his "*Flora Cestrica*," or description of the flowering plants of Chester County, appeared as a new edition of the former work. These and his other works, biographical and botanical, were all written during the intervals of his professional duties, and exhibit not only his eminent love of botany, but his disinterested labors in bringing to light the worthy cultivators of that science in his neighborhood. Temperate in his habits, moral and religious in his character, his mental faculties unimpaired to the last, he lived to a good old age, with the consciousness of a life well spent.

THE
AMERICAN JOURNAL OF PHARMACY.

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NOVEMBER, 1863.  
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ELEVENTH ANNUAL MEETING OF THE AMERICAN
PHARMACEUTICAL ASSOCIATION.

According to adjournment, the American Pharmaceutical Association commenced its sessions at the Hall of the University of Maryland, Baltimore, on Tuesday, September 8th, 1863, at 3 o'clock, P. M.

The meeting was called to order by the President, William Procter, Jr., of Philadelphia; P. W. Bedford, of New York, Secretary.

Alfred B. Taylor, of Philadelphia, W. J. M. Gordon, of Cincinnati, and Samuel M. Colcord, of Boston, were appointed by the Chair a Committee on Credentials, and pending its action the members present were invited to enroll their names on the register.

The Committee on Credentials reported the names of Delegates appointed to attend the meeting as follows :

From the Massachusetts College of Pharmacy.—Thomas Hollis, Henry W. Lincoln, S. M. Colcord, Charles A. Tufts.

From the New York College of Pharmacy.—George C. Close, William Neergaard, John Meakim, Ferdinand F. Mayer, P. W. Bedford.

From the Philadelphia College of Pharmacy.—Edward Parrish, Charles Ellis, William Evans, Jr., George J. Scattergood, William R. Warner.

From the Maryland College of Pharmacy.—J. B. Baxley, L. Phillips, James Balmer, J. J. Thomsen, William S. Thompson.

Cincinnati College of Pharmacy represented by W. J. M. Gordon.

The Chairman of the Executive Committees not having yet arrived, the President requested Mr. Colcord, of that com-

mittee, to act as Chairman and present the names of candidates for membership.

The following list was then presented :

Thomas E. Kirby,	Baltimore.	Columbus V. Emick,	Baltimore.
S. Robinson Coale,	"	John F. Hancock,	"
Alonzo Lilly, Jr.,	"	Alexander H. Everett,	New-York.
Wm. W. Cunningham,	"	Henry W. Schaffer,	Philadelphia.
Jonas Winter,	"	George M. Smyser,	"
E. Walton Russell,	"	C. Lewis Diehl,	"

A ballot being ordered, the President appointed John M. Maisch, of Philadelphia, and N. Hynson Jennings, of Baltimore, to act as tellers, who reported their unanimous election.

The roll was now called, and the names of those present noted by the Secretary.

Mr. Parrish, Chairman of the Executive Committee, having arrived, the names of the following gentlemen were presented as having been elected during the interim :

R. J. Toplis,	. . . . .	Yonkers, New York.
William F. Blocki,	. . . . .	Chicago, Illinois.
John C. Everson,	. . . . .	Philadelphia, Penn.
F. T. Whiting,	. . . . .	Great Barrington, Mass.
E. H. Price, M. D.,	. . . . .	Tamara, Illinois.
George P. Glazier,	. . . . .	Adrian, Michigan.
N. Crossman,	. . . . .	Waterloo, Canada West,
Richard Fener, Jr.,	. . . . .	Pittsburgh, Penna..

The Chairman then read the Report of the Executive Committee, as follows :

REPORT OF THE EXECUTIVE COMMITTEE.

The Executive Committee congratulate their fellow members on the favorable auspices under which we are again convened, and the encouragement furnished by the progress of events towards the establishment of the just authority of the Government, and the renewal of those relations of union and friendship, which, alone, can furnish a guarantee of permanent peace.

The preparation of the Minutes of the last Annual Meeting for publication, and the issue of the tenth volume of the "Proceedings," devolved upon the Chairman of this Committee, and notwithstanding the utmost efforts were used to hasten the publication, occupied near three months from the time of our meeting. The printing was done as usual, in Philadelphia, while the proof-sheets of the elaborate Report, (144 pages)

on the Progress of Pharmacy were sent for correction to Prof. Maisch, its author, then a resident of New York. The Roll was revised by the Treasurer, while the other portions of the "proof" were submitted, as far as practicable, to those most concerned in their correctness.

An edition of a thousand copies was printed and bound in cloth, to correspond with the previous numbers; two separate Indexes belong to the volume, one general Index and one pertaining to the Report on the Progress of Pharmacy.

The Index to the first eight volumes of the Proceedings, prepared by direction of the Association, and directed to be bound in the present volume, is also included in it, making an aggregate of 380 pages.

The cost of printing and binding the work was,	\$739.74
" of printing circulars, constitution, &c.,	6.25
" of indexing,	10.00
" of enveloping, packing boxes, postage, &c.,	39.84
	<hr/>
	\$793.83

The Treasurer has paid these expenses, as will appear by his Report. The few copies sold as far as reported, amount to \$20.

The distribution of the Proceedings to the members, was through a few members residing in the large cities, and by mail, as heretofore, each paying 25 cents postage. The members residing in the States under protection of the Union forces, were generally supplied, some beyond the lines, and a few others, accidentally omitted, may yet claim their copies.

The stock of "Proceedings" stored in the Philadelphia College of Pharmacy, has not materially altered since the last report; it is nearly as follows:

For 1853,	250 copies.	1858, bound.	97,	unbound,	309
" 1854,	57 "	1859, "	95,	"	14
" 1855, out of print,		1860, "	188,	"	
" 1856, 42 copies,		1862. "	368,	"	
" 1857, bound, 29 copies.					
" " unbound, 289 copies.					

Other copies have been sent on sale to members in New York, Boston, Baltimore, St. Louis, Cincinnati, and we think that in each of these cities, and perhaps others, one member should be regularly appointed to receive, distribute and sell copies of the Proceedings of the Association; each of these distributors to make report to the Executive Committee annually, of the stock on hand; in this way we can keep advised of the condition of our stock—a matter which must become increasingly important, as the volumes become scarce and the demand for back numbers increases with the increase of the membership.

The gratuitous distribution of the volume to the Medical and Scientific Institutions and Periodicals in this country, has, we think, been too little

attended to, partly from want of definite instructions to the Committee. We believe that less than 50 copies have in any year taken this direction, while this must be regarded by all as the chief means of extending a knowledge of our Association.

Through the Smithsonian Institution, we sent about 40 copies to Foreign societies, periodicals and individuals interested in the Science and Art of Pharmacy.

Eight members have been elected during the past year by the Executive Committee; their names have been reported.

The Certificates of Membership, engraved and printed several years since, have nearly all been issued, and your Committee have but 22 copies in their hands; a few are deposited with the Treasurer; nearly 50 have been wasted by the mistakes in signing them, or by the signing of unnecessary numbers by the officers, in advance of their being required. It is believed that not a few of those applying for membership, have this diploma in view as a leading motive, and it has seemed to the undersigned, that great care is necessary, that unworthy individuals should not be placed in possession of so conspicuous a testimonial; for, although this certificate does not really carry with it any evidence of proficiency it may obtain for its possessor, more consideration from the uninitiated than the less showy diplomas of our Colleges of Pharmacy. In this view, the applications of some young and inexperienced pharmacutists, who might by application become graduates in Pharmacy, have been discouraged by the Chairman of this Committee.

The annually recurring duty now devolves upon us, of revising our list of members, with reference to those who have passed from the present scene of probation. Of these we have been informed of as follows:

Charles T. Carney,	Boston,	Massachusetts.
David Roberts,	Boston,	Massachusetts.
Francis O. Bigelow,	Medford,	Massachusetts.
E. E. Knapp,	Norwalk,	Connecticut.
John P. Dodge,	New York,	New York.
T. C. McIntire,	Washington,	District of Columbia.
S. B. Waite,	Washington,	District of Columbia.
Asbury Kent,	Cincinnati,	Ohio.
G. Davidge Wood,	Baltimore,	Maryland.

CHARLES TIBBETTS CARNEY was born in Lowell, Mass., Feb. 17, 1832. When a boy he chose the profession of Pharmacy, as congenial to his tastes and affording him the means of prosecuting the study of Chemistry, for which he early discovered a fondness. He commenced his career as a Student of Pharmacy, with the firm of Carleson & Hovey, in Lowell, where he continued till 1853, when he entered the Scientific School of Amherst College; with the design of pursuing his chemical studies. Some years afterwards he received the honorary degree of Bachelor of Science

from this College. He commenced business in Lowell, but in a few years removed to Boston, where he entered with zeal into the labors and responsibilities of the drug business, but with an unfortunate result; after six years of striving, he yielded to an accumulation of debt, and made an assignment for the equal benefit of his creditors. His feelings on the occurrence of so trying an event were those of a true man, and, in a letter to a friend, he speaks of the one consolation, "that there can be found no stain or shadow on my honor or integrity." His next recourse was to the profession to which his earliest choice had been given,—that of a Chemist. In March, 1862, he opened a laboratory for Experimental Chemistry and Analysis, which promised to be a highly successful business, but alas! our friend was not destined to enjoy the rewards of industry or enterprise, which now opened before him. The seeds of consumption, that invidious disease which carries off so many thousands in their youth and beauty, had been slowly, but surely, developing in his system. In August, 1862, he went to seek in the equable climate of Minnesota, a respite from the steady progress of his disease. He died suddenly from hæmorrhage of the lungs, on the 23d of September, 1862, at Pine Bend, Minnesota. His body was removed to Boston, and interred in the family tomb, under Trinity Church. In contemplating this awful event, we have the assurance from those who were cognizant of his state of mind, that the same unfaltering faith and trust in Providence, that supported him through so many hours of trial, never failed him, and in his illness he looked with perfect peace through the dark valley to the shining mansions beyond.

The reputation of our late associate, as a chemist, was, perhaps, rather local than general, yet our knowledge of him as a co-laborer in this Association, enables us to speak with confidence, both of his industry and capacity. We learn that at one time he was appointed on the Examining Committee, in Chemistry, at Harvard College, a well deserved acknowledgment of his scientific ability. We are informed that he was usefully and honorably connected with the investigation of the qualities of the Green Oxide of Chrome, as a tint for bank-note engraving, and by an original investigation, proved that this dye was not, as had been asserted, a complete safeguard against counterfeiting. This discovery was made at the instance of the Association of Banks, for the suppression of counterfeiting, by whom he was employed as a chemical counsellor.

Our friend became a member of this Association, in 1853, the first year of our meeting in Boston, and soon became actively concerned in its affairs. Several of his original papers appear in our published volumes of "Proceedings," of which none have attracted more attention than his Reports on Home Adulterations, read at the Annual Meetings in 1859, and 1860.

As Chairman of the Executive Committee, in 1859, he superintended the voluminous publication of the volume of that year.

Not by his zeal and ability as a Chemist and Pharmaceutist merely, but by his excellence as an associate and friend, are we led to mourn the death of Charles T. Carney, one of the youngest, most gifted and best beloved of our members.

DAVID ROBERTS, of Boston, died suddenly of cholera morbus, in August, 1863. Though a practical pharmacist, he was also a graduate of medicine. He is spoken of by his brethren of the profession in that city, as a good apothecary and an honest man; though he took no active part in the movements in progress, for the improvement of our profession, he connected himself with this Association in 1858, and was an example of probity to those with whom he came in contact. He died at the age of 35.

FRANCIS O. BIGELOW, of Medford, Mass., fell a victim to consumption. He had been a traveller in pursuit of health, in Texas, but returned to his home to die. He is represented as a man of excellent character, intelligent and much interested in the progress of pharmacy, of which he was himself a good practitioner. He was much esteemed for honesty and a gentlemanly deportment, which endeared him to those who knew him. His connection with this Association, dates from 1859.

EDWIN E. KNAPP, of Norwalk, Connecticut, late of the firm of Knapp & Lynes, died on the 13th of August, 1862, of pulmonary consumption. He was born on the 16th of June, 1820, and became a member of this Association in the year 1860.

JOHN P. DODGE, of New York City, who became a member of the Association in 1857, was a victim to the present gigantic struggle for the maintenance of the Union; he was a Captain in ——— Regiment, of New York State Volunteers, and fell mortally wounded while leading his Company in the attack on Fredericksburg, under Gen. Burnside. He was buried with military honors by the city authorities of the City of New York.

Your Committee regret that these sketches of our departed associates are so meagre, through the want of information in relation to their character and circumstances, and hope that succeeding committees may be better informed in regard to those who may be added to the list of the departed hereafter. Respectfully submitted.

Special Reports being in order, that on the Sale of Poisons was called for, but the Chairman, S. M. Colcord, stated that no report was ready, and that the Committee were discouraged from attempting one further than had been done.

The Chairman of the Committee on the Drug Market signified his readiness to report to-morrow.

The Chairman of the Committee on Progress of Pharmacy was ready to report to-morrow.

The Report of the Committee on Queries for 1864 was also ready.

It being now in order to appoint a committee for the nomination of Officers to serve during the ensuing year, the delegations present selected, in accordance with the Constitution, the following members :

Samuel M. Colcord,	.	.	Boston.
John Meakim,	.	.	New York,
William Evans, Jr.,	.	.	Philadelphia.
J. Brown Baxley,	.	.	Baltimore.
W. J. M. Gordon,	.	.	Cincinnati.

The President then added the following :

Alpheus P. Sharp,	.	.	Baltimore.
Edward R. Squibb,	.	.	Brooklyn.
Edward Parrish,	.	.	Philadelphia.

On motion, the name of the President was added to this Committee, which was adopted.

On motion of Mr. Parrish, which was adopted, it was Resolved to hold three sessions on the following day, the hours to be designated hereafter.

The President then read his Annual Report, as follows :

ANNUAL REPORT OF THE PRESIDENT, 1862—63.

Gentlemen of the Association :—

The period has arrived when in the fulfilment of a Constitutional requirement, it is my duty to address you in reference to the several subjects which should justly claim our attention at this, our Eleventh Annual Meeting.

The condition of political affairs since our last Convention in Philadelphia has been so disturbed, the current of the public mind so much diverted from its usual peaceful channels by the untoward accompaniments of war, it can hardly be expected that our members should be so far exempted from the common lot, as to have carried out the various special labors assumed a year ago; yet it is with no ordinary feelings that I congratulate you, fellow members, on the shaping of events by which we are enabled once more to convene together in this large city, in the pursuit of the laudable and useful objects of our National Association, and to indulge the hope that, before our next annual meeting, our afflicted country may emerge from the storm clouds and gloom which have so fearfully enveloped her, and the blessings of peace once more return throughout her ancient borders.

Ours is a peaceful profession, yet when the calamities of war assail, our aid is among the first invoked ; consequently a large number of our members or their subordinates have been drawn into the service of the medical corps of the army. This is a cogent reason for the limited attendance of our members, and which will cease with the return of peace.

In the interim between the meetings, the vitality of the Association asserts itself through the EXECUTIVE COMMITTEE, from whose Report we have already had an outline of the labor performed during the year. The importance of having this Committee carefully constituted cannot be overrated. The amount of labor to be performed is large, its usefulness great, and its continuance in some respects unremitting. A degree of enthusiasm is needed to carry it through successfully, and no one expecting a sinecure should be placed in the Chairmanship. The editorial duty appertaining to this office, calls for a special qualification, and so long as the Constitution devolves upon its incumbent the preparation and publication of the Proceedings, he should be chosen mainly with a view to this important service. It is believed that a code of rules for the guidance of the two great Standing Committees of the Association would prove a valuable aid to them in the performance of their several duties.

The limited number of applications for membership during the past year is what might have been expected. It will be well to reconsider that portion of the Constitution by which members are created in the interim, and see if more affectiveness cannot be given, as regards the determination of the qualification and standing of the applicants, and in shortening the routine now required. It is the duty of the Executive Committee to hold custody of the Property of the Association, which, at this time, is solely of a literary character. It is information interesting to the members, and useful to his successor, when the Report of the Chairman of that Committee is accompanied, as in the present instance, by a list of the property in his charge ; and whilst a list of the documents which are independent of the published Proceedings should not be required, it should be expected that this portion of the manuscript archives of the Association should be regularly kept in order, and annually reported as in proper condition for transmission to the next Committee.

The TREASURER will report to you on the condition of the finances of the Association, during the past year. The funds have been more than equal to the needed expenditure, leaving a handsome balance to go with the contributions now due, to meet the outlays arising from the present meeting.

The labors of the " Committee on the Progress of Pharmacy " will be laid open for your inspection at an early period in the future sessions of this meeting. The Annual Report on the Progress of Pharmacy has always possessed considerable interest, but during the last three or four years it has assumed a form which gives it a prominent place in the Proceedings, as a record of observations and discoveries.

At the meeting in New York, (1860), the retiring President suggested that the duties of this Committee should be divided amongst its members, so that each shall make a special report on a particular branch of the subjects of inquiry. If I understood the suggestion, it was not proposed to reconstruct the Committee, but only to apportion the subjects, so that, for instance, whilst the Chairman should make out a regular general Report, or resumé of the Journals, one member, say the Corresponding Secretary, should report on the pharmaceutical institutions at home and abroad; another on the literature of pharmacy and chemistry, evolved during the year; a third on the novelties and improvements in shop practice with a special view to extemporaneous and fancy pharmacy, and the last should have charge of the whole subject of toxicology as it interests the apothecary, so far as to report on—1st, cases of poisoning and antidotes used; 2d, on legal enactments just passed or on the working of old laws; and lastly, any suggestions that may arise bearing upon the subject. In this way each member of the Committee by having a distinct sphere of action and responsibility would be incited to greater industry, and the Chairman, by confining his attention to the general record of Pharmaceutical Progress, could give a more complete and well digested Report. To guard against the failure of the other members of the Committee to report, it would be safe to require the subsidiary reports to be handed to the Chairman, at least two weeks before the meeting occurs, so that in the event of inability, or other causes of failure on the part of his co-laborers, the Chairman may have time to supply the deficiency as far as possible.

The Committee on the Drug Market has not been idle during the interim. The indefatigable Chairman of that Committee, despite his pressing engagements, has found time to prepare a report, which will be found to possess considerable interest, and is the first of the series which may be looked for from this new Standing Committee, in the future progress of the Association.

The appropriate duties of this Committee were not pointed out in the minute of its appointment. Its action may become exceedingly useful if rightly directed and perseveringly pursued; or it may be productive of no good results. That success should attend it, the Chairman should be so situated near the principal foreign drug trade and manufacturing marts, as to have the necessary opportunity through the entire year to get access to the facts, and his coadjutors should be selected, both by location and ability, with a view to the work. To speak of the Drug Market in a way to be useful to the reader, the Report must be practical—the result of inquiry, observation, and experiment. It should inquire what is in the Market—how it gets there—and what is its condition as to quality and purity, noting all adulterations and sophistications; and lastly, it should include a tabular view of medicinal imports and indigenous medical products, with such a sketch of the statistics of pharmaceutical and

chemical manufacturing as a proper history of the Drug Market justly calls for.

The Committee on a "List of Queries for Investigation," having had a sufficient time to make a well digested report, it is to be expected that a more careful selection has occurred than hitherto has been possible from the hurried manner of the service during the sessions.

The suggestion of subjects for prizes, which also comes within the scope of this Committee, requires careful consideration. In giving a direction to the talents of original investigators, the actual usefulness of the results sought, should be more conspicuous than their mere scientific interest, although this should by no means be overlooked, so that direct benefit may accrue to our profession.

At last accounts from the Chairman of the Committee on Poisons, which was appointed in 1860, the prospect of a Report was extremely doubtful.

In reflecting on that clause of the Constitution relative to life membership, the question has arisen, how is the Association to be supported in the future so as to meet the natural increase of its expenses? The support of the Body is virtually thrown on a new set of members every ten years. Assuming that our present income is just sufficient to carry us on, we must necessarily ten years hence have just double our number. Where then is the margin for prizes, and other extraordinary outlays? Will it not be wiser to reduce the annual subscription to *one dollar* after ten years membership, so that the sum will cover the cost of a copy of the Proceedings due to each member, and give a reserved pecuniary power for the future?

It is not incompatible with the duties of this occasion to occupy a few minutes with our National Pharmacopœia. After a lapse of more than three years. The Committee having charge of the revision and publication of that work, have completed their labors, and it is now fairly before the pharmacutists of this country. It is believed that in most respects it is the most complete Pharmacopœia we have had, and justly merits the study of every apothecary. It is time, gentlemen, that our practitioners of Pharmacy, of every grade, should *know* that we have a United States Pharmacopœia, by personal inspection. Hundreds, perhaps thousands, have never seen the work and know of it only through the several commentaries, and more particularly that in the U. S. Dispensatory, which is often confounded with the Pharmacopœia. The Committee, at the express recommendation of the Convention at Washington, have had the price put so low (\$1) that no excuse can possibly exist on the score of expense, and to give encouragement to its general dissemination, it is recommended that a resolution be brought forward by the Business Committee, if they approve of it, urging on the members of this body and on pharmacutists and druggists generally, that they acquaint themselves with it by

personal study with the intention of adopting its formula, and of giving greater uniformity to officinal preparations.

Before closing this Address, I would fain reimpress on you, fellow members, the need we have of more earnestness—I might say enthusiasm—in order to carry forward the several objects of our consociation with zeal and success. Already our National Association, through its Proceedings and manner of organization is attracting notice abroad, and our colaborers there are looking to us for fruits proportioned to the profession we make. Let us then individually interest ourselves in the work of progress—each in his own way; and by well directed efforts at home, among our fellow pharmacutists, let us increase our numbers so as eventually, if possible, to include all the better qualified and liberally disposed pharmacutists and druggists in the whole country. That our Association has been able to keep up its organization in the face of the discouraging circumstances which now surround it, is, to me, gentlemen, a strong evidence of its vitality, and leads to the assurance that when peace once more smiles upon us our Society will, with a due amount of *esprit de corps*, become an honor to American pharmacutists, and command the respect of our brethren everywhere.

Having now presented the several topics which have appeared appropriate for the occasion, it remains for me, gentlemen, before vacating this Chair, which your partiality has placed in my keeping during the past year, to express to you that I have had a just appreciation of your confidence, and a sincere wish to merit your approbation.

WILLIAM PROCTER, JR.

On motion of Dr. Squibb, it was resolved, that when this meeting adjourns, it be to meet to-morrow morning at 9 o'clock.

The following Resolution was presented and adopted:

Resolved, That the Professors of the University of Maryland and of the Maryland College of Pharmacy, be invited to take seats in this meeting during its sessions.

The meeting then adjourned.

Wednesday September 9th—Second Session.

The meeting being called to order by the President, the Secretary read the Minutes of the preceding meeting, which were adopted.

The Executive Committee presented the names of the following gentlemen for membership, which were then ballotted for and duly elected:

Henry J. Weber,	Philadelphia.
Talbot C. Murray,	"
George F. H. Markoe,	Boston.
George J. Waugh,	Canada West.
Elisha H. Perkins,	Baltimore.

The Nominating Committee reported the following names for Officers and Standing Committees during the ensuing year, viz. :

For President.

J. FARIS MOORE,	Baltimore.
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For Vice-Presidents.

JOHN M. MAISCH,	Philadelphia.
CHARLES A. TUFTS,	Dover, N. H.
GEO. W. WEYMAN,	Pittsburgh, Pa.

For Treasurer.

J. BROWN BAXLEY,	Baltimore,
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Recording Secretary.

WILLIAM EVANS, Jr.	Philadelphia.
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Corresponding Secretary.

P. W. BEDFORD,	New York.
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Executive Committee.

ALFRED B. TAYLOR, <i>Chairman</i> ,	Philadelphia.
ALPHÆUS P. SHARP,	Baltimore.
FREDERICK STEARNS,	Detroit.
M. H. GLEASON,	Boston.
WM. EVANS, Jr., <i>Ex-officio</i> ,	Philadelphia.

Committee on the Progress of Pharmacy.

GEORGE J. SCATTERGOOD, <i>Chairman</i> ,	Philadelphia.
GEORGE C. CLOSE,	Brooklyn.
JAMES T. KING,	Middlet'n, N. Y.
N. HYNSON JENNINGS,	Baltimore.
P. W. BEDFORD, <i>Ex-officio</i> ,	New York.

On motion, a ballot was ordered for President and Vice-Presidents, when the tellers reported their unanimous election.

On motion, the President was requested to deposit an affirmative ballot for the remaining Officers and Committees; when the tellers reported their election.

The retiring President then invited the President and Secretary elect to occupy their respective Chairs.

President Moore, on taking the Chair, made the following brief remarks:

Gentlemen of the Association:—

In choosing me to preside over this meeting you have paid the highest compliment to one of your youngest members, an honor which I duly appreciate. Although ignorant of many parliamentary usages, and feeling the responsibility resting on me as the successor of such men as Meakim, Colcord, and Procter, I shall endeavor to discharge the duties you have placed upon me to the best of my ability, and earnestly crave your indulgence with any short-comings.

Joseph Roberts, on behalf of the Pharmacutists of Baltimore, invited the Association to take part in an excursion down the Bay, on Thursday afternoon, which was accepted.

The consideration of the Treasurer's Report of the last year being called up, it was read and accepted. On motion, the Chair appointed John Meakim and James T. Shinn a Committee to audit the Report.

[From this report we learn that the Association is free from debt, and that there is a balance on hand of \$498.34. The receipts during the past year show a slight increase, but the expenses have been much larger than ever before, and should the same ratio continue for more than a year or two, the Treasurer recommends care in regard to future measures requiring expense. A full statement of receipts and expenses were appended.]

The Report of the Committee on the Progress of Pharmacy being called for, it was read, in part, by Prof. F. F. Mayer, Chairman, who stated that it commenced with the date of the conclusion of Prof. Maisch's Report last year. It was accepted, and referred to the Executive Committee for publication.

Edward Parrish, in moving this disposition of the Report, commended the labor and preseverance required in its preparation, and believed that the acknowledgments of the Association were due to the authors of the reports which have been received from this Committee for several years.

The Report of the Committee on the Drug Market being in order, it was produced and read by the Chairman, Dr. E. R. Squibb. This Report was illustrated by several specimens and indicated the expenditure of much labor. The Report was accepted and referred to the Executive Committee for publication.

John M. Maisch, in connection with the subject of the Report, presented a specimen of Benzoin, which came from a respectable drug house in New York, consisting of chips of wood agglutinated by some resinous substance, containing not a trace of benzoic acid, and but a slight trace of cinnamic acid. He stated that it had been sold to perfumers.

William Procter, Jr., from the Committee to bring forward queries for investigation, read a Report, which, on motion, was accepted, and the Committee continued to obtain the names of members willing to accept subjects for investigation, to be reported on next year.

J. J. Thomsen presented a communication from William Saunders, of London, Canada West, accompanying samples of Canadian pharmaceutical manufactures. He also introduced to notice sundry preparations, which had been received by him for exhibition at this meeting, from H. T. Cummings, of Portland, Maine, from James S. Aspinwall, of New York, W. R. Warner, of Philadelphia, and others.

The Committee appointed to audit the Treasurer's account reported that it was correct, and they were discharged from further service.

A communication was received from the publisher of the Chemist and Druggist, London, accompanied by 20 copies of the last number of that Journal, asking that the Proceedings of the meeting might be forwarded for publication.

On motion of the Chairman of the Business Committee, the letter was accepted and referred to the Corresponding Secretary, with directions to reply to it and also to comply with the request contained in it.

The following names of candidates for membership were brought forward by the Executive Committee:

John C. Long,	.	.	Lancaster, Penna.
Francis X. Dooley,	.	.	Washington, D. C.
James G. Nagle,	.	.	Baltimore, Md.

The subject of offering prizes the present year being referred to by Prof. Procter, it was, after some discussion, and in view of the fact that the prizes offered last year will not be matured until 1864, dismissed for the present.

The propriety of continuing the Committee on the Sale of Poisons being under debate, it was finally agreed, on motion, that the Committee be, for the present, discontinued.

The Business Committee brought up the matter of life-membership, alluded to in the President's Report, and stated that soon, under the Constitution, the funds of the Association would be very much curtailed by old members becoming exempt from the annual payment. After some discussion by Messrs. Parrish, Ellis, Taylor, Haviland, etc., the consideration of the subject was indefinitely postponed.

The following Resolution was offered by Edward Parrish, viz. :

That the Corresponding Secretary be directed to address the publishers of such Pharmaceutical and Chemical Journals in foreign countries as would be of value to our Committee on the Progress of Pharmacy, asking that the numbers of their Journals for the year be sent to the Chairman of that Committee, or other suitable address, in exchange for the Proceedings of this Association, and that he be authorized to draw on the Treasurer for the expenses of such exchange, and, if necessary, for the cost of subscription to the more desirable periodicals.

The Resolution was adopted.

Edward Parrish moved that a committee of three be appointed to take into consideration the present constitutional provision for the election of members, and also the propriety of issuing a new form of certificate of membership.

After some discussion the resolution was adopted.

On motion of Dr. Squibb, it was *Resolved*, That the Committees on Scientific Queries, on the Drug Market, and the Business Committee, be appointed by the Chair.

The subject of the place of meeting next year being under debate, Mr. Gordon suggested that it be held in Cincinnati, Ohio, but without coming to a decision, the meeting adjourned to 3 o'clock, P. M.

Wednesday afternoon—Third Session.

The meeting was called to order, about an hour after the time adjourned to, by the President.

The minutes of the last meeting were read, amended and adopted.

The discussion of the time and place of meeting next year being resumed, it was moved by Dr. Squibb, that when we adjourn it be to meet in Cincinnati, Ohio, on the afternoon of the third Wednesday in September, 1864, at 3 o'clock. After discussion the motion prevailed.

On motion the Chair appointed A. P. Sharp, of Baltimore, Charles A. Tufts, of Dover, N. H., and George J. Scattergood, a committee to examine and report on the specimens on exhibition.

The papers in answer to the Scientific Queries being called up:

No. 1. On *Chenopodium*, elicited no reply; Mr. Balmer had engaged himself in the investigation, but the paper was not sufficiently complete to offer to the Association.

No. 2. Edward Parrish, stated in reply to this question in regard to *Capsicum*, that at the period when it was in his opinion favorable to engage in its solution, he was prevented from accomplishing any results. It was continued.

No. 3. On the Production of Tartar in the Ohio Valley, Mr. Gordon, though absent when brought up, subsequently replied verbally, that owing to the opinion prevailing among wine-growers, that Tartar is advantageous to the wine while in contact with it, no cream of tartar is offered for sale from the wine region of Ohio, and that it is not likely that there will be any samples of it which will affect the trade.

No. 4. Relative to Aconite Root, was replied to by William Procter, Jr., and the paper was referred for publication.

No. 5. On Cantharidin, was continued to Professor Moore, he not being ready to reply.

No. 6. On Conium Seeds, was replied to by Mr. Close, of Brooklyn, N. Y., and referred for publication. The reading of this paper induced some interesting remarks from Dr. Squibb, Mr. Procter and others, showing the fugitive nature of Conia, and the care requisite in making its preparations.

No. 7. On the History of the Pennsylvania Coal Oil Production, etc., was not replied to, Mr. Weyman, of Pittsburg, not being in attendance at the meeting.

No. 8. On Creosote, not replied to by Mr. Bullock.

No. 9. Relative to the physiological action of Propylamin. Prof. R. P. Thomas, to whom this query and No. 11 was referred, in a letter to the President, remarks as follows:

*"Dear Sir—*Question 9 of the Proceedings of last year, referred to me, concerning the influence of Propylamin on uterine contraction, is in process of investigation. Cases seldom occur in which a trial could be made, and, therefore, more time is required. The question had better be continued.

Question 11. "What is the true botanical source of 'Southern Prickly Ash-bark?' cannot be investigated during the war. I suggest that it be dropped for the present. Very respectfully yours,

ROBERT P. THOMAS."

The question was continued to Dr. Thomas as requested.

No. 10. James T. Shinn stated that he had been unable to carry out the investigation of the vegetable astringents.

No. 11. Dropped from the list for the present, by request of Prof. Thomas.

No. 12. Prof. Maisch read a paper answering this question in relation to the solubility of Tartaric Acid, etc., which was accepted and referred for publication.

No. 13. This question not being replied to, was continued on the list, and referred to Edward Parrish.

No. 14. On a pharmaceutical still, was replied to by Prof. Procter, who illustrated his remarks by a tinned iron still, of four gallons capacity, of the form described in his paper. The latter was referred for publication.

A volunteer paper, by Thomas S. Wiegand, of Philadelphia, on the subject of the last query being now reported, and deemed appropriate to be read at this time, it was accordingly read by James T. Shinn, who illustrated it by a diagram. The paper was accepted and referred.

The whole subject of distillation being now before the Association, critical remarks were made by Dr. Squibb and others upon stills now in use. P. W. Bedford stated that the copper cans in which volatile oils are sold in commerce, may be converted read-

ily, either into kettles for boiling syrups, or into boilers for stills, adapting a tinned iron or copper head to them.

No. 15. In relation to specific gravity was not replied to by Dr. Pile, to whom it had been referred.

No. 16. Received no reply from Mr. Sackrider, of Cleveland.

No. 17. On the Buchu of Commerce, was replied to by P. W. Bedford, in a paper illustrated with specimens of the oils of the two ordinary commercial varieties. It was referred for publication.

No. 18 and 19. Received no reply from Messrs. Wright and Tilden.

No. 20. On the preservation of volatile oils, was replied to by Alfred B. Taylor, whose paper was referred for publication.

This paper gave rise to an interesting discussion on the action of light, and it was stated that canary colored glass had proved very useful, practically, in excluding the actinic rays.

The Association now adjourned to 8 o'clock this evening.

Wednesday evening—Fourth Session.

The President called the meeting to order near the appointed time, and the minutes of the preceding session were read by the Secretary, and adopted.

The Chairman of the Executive Committee brought forward the names of James B. Heyl Hamilton, Bermuda, and Joseph C. O'Brien, of Baltimore, Md., for membership. A ballot was ordered and these gentlemen were unanimously elected.

On motion of Charles Ellis, it was granted that a new certificate of membership be given to Washington L. Laycock, in lieu of one destroyed by fire, which certificate shall be a copy of the one received by him originally, said copy to be marked duplicate.

The reading of Scientific Queries being now resumed, a reply to No. 21, on Sanguinaria, referred to Professor R. P. Thomas, was read by Prof. Procter. The paper was accepted, and referred to the Executive Committee for publication.

No. 22. On Fluid Extracts, was replied to, in an elaborate

essay, by Prof. Procter, which was read, accepted and referred for publication.

No. 23. On Mustard Seeds, was not replied to by Prof. Moore.

No. 24. Prof. F. F. Mayer, of New York, read a reply to this query, which was accepted and referred for publication.

Then, on motion, adjourned to meet at 9 o'clock to-morrow morning.

Thursday morning, Sept. 10th, 1863—Fifth Session.

The Association was called to order by the President, and the minutes read and adopted.

The name of Gustavus Dohme, of Baltimore, was brought forward for membership, by the Executive Committee. A ballot being ordered, it resulted in his unanimous election.

The President announced the following Standing Committees :

On the Drug Market.—John M. Maisch, of Philadelphia, Chairman; William S. Thompson, of Baltimore; Ferdinand F. Mayer, of New York; Samuel M. Colcord, of Boston; Charles Bullock, of Philadelphia.

On Scientific Queries for 1864.—Edward Parrish, of Philadelphia, Chairman; N. Hynson Jennings, of Baltimore; Richard H. Stabler, of Alexandria, Va.; James T. Shinn, of Philadelphia.

Business Committee.—Dr. E. R. Squibb, Chairman; Joseph Roberts, of Baltimore; W. J. M. Gordon, of Cincinnati.

On the present Constitutional Provision for the Election of Members, and on the propriety of issuing a New Certificate of Membership.—Edward Parrish, Chairman; John Meakim, of New York; James Balmer, of Baltimore.

The reading of Scientific Queries was resumed.

No. 25. On the Impure Commercial Oxides of Iron, was replied to by Ferris Bringham, of Wilmington, in a paper read by Edward Parrish, which was accepted and referred.

No. 26. Elicited no reply from Jonas Winter, of Baltimore.

No. 27. Do the Mineral Acids of American origin contain

appreciable amounts of Arsenic? was replied to by Prof. Maisch. On motion, the paper was referred for publication.

No. 28. Referring to Marl as a source of Potash, was answered by a paper from George J. Scattergood, who being absent, the paper was read by the Secretary, accepted and referred.

No. 29. On Dialysis, was not replied to by Prof. Procter, who plead want of time to complete the necessary investigations required to give the paper an acceptable form. On motion, it was continued to him.

No. 30. Edward Parrish read an interesting paper in answer to this query, on the Internal Revenue Law, which was accepted and referred as usual.

No. 31. P. W. Bedford replied to this query verbally, that he had separated Sanguinarina from Chelidonium majus, but had no written paper to offer. Prof. Maisch believed that this alkaloid could not be obtained so economically as from Sanguinaria-root.

A volunteer paper on "Æsthetical Pharmacy," written by Frederick Stearns, of Detroit, was read by Prof. Procter. The paper was well received, and, on motion, was referred for publication.

A volunteer paper entitled "A Plea for the Hand-Maiden," was read by Edward Parrish. It was, on motion, accepted and referred for publication.

The Executive Committee brought forward the names of William H. Brown, of Baltimore, Alexander E. Brown, of Baltimore, J. Elwood Morrison, of Baltimore, and Charles E. Dohme, of Baltimore, for membership. When a ballot was ordered, and they were unanimously elected.

The Report of the Committee on Specimens was read, accepted, and directed to be published.

Dr. Squibb, of the Business Committee, presented the following preamble and resolutions,—viz.:

Whereas, It is desirable that during the interval between the decennial revisions of the Pharmacopœia there may be some repository in this Association for the information and knowledge resulting from prolonged practical use of the officinal formulas; and some members whose particular duty it may be to observe during this interval what additions or omissions might be usefully made in the next ensuing revision; therefore,

Resolved, That a permanent Committee on the Pharmacopœia, to con-

sist of three members, be appointed to keep a current commentary upon the Pharmacopœia, and a record of all useful criticisms and suggestions that may be made upon it while in practical use, with a direct view to its future revision; and that the Chairman of this Committee may, at his option, report an abstract of such information as he may gain at the annual meetings of the Association; and, finally, that members generally be requested to communicate to the Chairman any information or suggestions bearing upon the duties of the Committee.

The resolution was adopted, and the President appointed E. R. Squibb, W. Procter, Jr., and A. B. Taylor, to act on the Committee.

Edward Parrish offered the following resolutions:

Resolved, That the late edition of the U. S. Pharmacopœia, issued by the Committee of Revision and Publication appointed in Washington in 1860, meets the warm approval of this Association, and we commend it to the universal acceptance of the physicians and pharmacutists of the United States, and will use our individual efforts to give it currency and to enforce its authority as the standard of practice throughout the country.

Resolved, That our thanks, and the thanks of the profession at large, are due to the Committee of Revision and Publication for their zeal and perseverance in the difficult and onerous labor devolving upon them, and for the production of a volume so universally approved and accepted.

They were, on motion, adopted.

Prof. Procter, Chairman of the Committee on Scientific Queries, stated that a large number of the queries before reported had been accepted by members present, and some referred to others not in attendance, but that many of the queries still remained unaccepted.

The Report was now again read, and finally adopted and referred to the Executive Committee, who are authorized to publish the names of members who may be found to accept questions yet open for investigation. The Report is as follows, viz:

The Committee appointed at the meeting in Philadelphia in 1862, to report a series of questions for investigation, offer the following as the results of their labor:—

1. Fermentation and cryptogamic vegetation viewed as destructive agents in connection with drugs and pharmaceutical preparations. What are the best means of avoiding the former, and arresting the growth of the latter without injury to the drugs and preparations?

Accepted by George J. Scattergood, of Phila.

2. Is there a practicable process whereby Aloin may be easily extracted

from commercial Aloes, so as to reduce the price of this principle in the market?

Accepted by P. W. Bedford, of New York.

3. Is there an eligible means by which all the medicinal matter of Cinchona may be held in a permanent solution without deposition of cinchonates or cinchonic red?

Accepted by Alfred B. Taylor, of Phila.

4. What is the best process for extracting lard so as to fit it for the purposes of Pharmacy; and what the best means for preserving it for use during the summer and autumn?

Accepted by Henry W. Lincoln, of Boston.

5. What is the proportion of camphor present in the officinal Aqua Camphoræ?

Accepted by George F. H. Markoe, of Boston.

6. Does the aqueous extract prepared from Jalap that has been previously exhausted by alcohol possess any medicinal properties, or does the alcoholic extract of Jalap fully represent its virtues?

Accepted by Alfred B. Taylor, of Phila.

7. Does the volatile oil of Matico possess the power of stopping hæmorrhage, or does that property of the drug reside in some other ingredient, or in the physical structure of the leaf?

Accepted by James S. Higgins, of New York.

8. On the pharmacist as a merchant, and on commercial education in relation to the successful prosecution of the pharmaceutic art.

Accepted by Frederick Stearns, of Detroit.

9. Stramonium is abundant in the United States, and its alkaloid Daturia is alleged to be identical with Atropia in Belladonna. If this be true, in what relative proportions do these plants contain this principle, and why may not Stramonium be used as a source of Atropia?

Accepted by Prof. F. F. Mayer, of New York.

10. It is now known that liquid Storax is a product of Liquidambar Orientale, a tree closely resembling *L. styraciflora* of the United States. It is also well known that our indigenous Liquidambar yields in warm latitudes a balsamic exudation, analogous to storax in odor and to tolu in consistence; and contains cinnamic and benzoic acids. Query.—Will this tree yield a product identical, or nearly so, with commercial storax, if it is treated in the same manner?

Accepted by William Procter, Jr., of Philadelphia.

11. Is nicotina the active principle in carefully dried green tobacco leaves? Do the seeds of tobacco contain the same alkaloid? and if so, does the proportion of nicotina found in commercial (fermented) tobacco justify the belief of Liebig (*Agricultural Chemistry*, Amer. ed., 184), that nicotina is an artificial product?

Accepted by Prof. F. F. Mayer, of New York.

12. What is the best arrangement for spreading plasters of uniform sizes rapidly and well; and what is the best form and weight of spatula

for spreading plasters extemporaneously? together with observations on the dispensing of this form of preparations.

Accepted by Edward Parrish, of Phila.

13. Bitter Wine of Iron. What is the best formula for this preparation, in which citrate or tartrate of iron is presented along with one or more bitter tonics and aromatics, combining efficiency as a chalybeate tonic with elegance and agreeability in appearance and taste; with comments on similar preparations now in use?

Accepted by James T. Shinn, of Phila.

14. Glycerin—its mission (so to speak) in Pharmacy as a remedy, as an adjuvant, and as a solvent.

Accepted by W. J. M. Gordon, of Cincinnati.

15. It has been stated that the poisonous properties of *Rhus toxicodendron* reside in a volatile alkaloid. Is this true? Is this alkaloid dissipated when the leaves are dried? Can it be isolated in a state fit for medical use, or can the properties of the leaves be preserved in some form as a pharmaceutical preparation?

Accepted by John M. Maisch.

16. The leaves of *Solidago odora* possess the odor of anise. Are their medicinal properties due to a volatile oil, identical in composition with the oil of aniseed?

Accepted by Charles A. Heinitsh, of Lancaster, Pa.

17. The oil of *Erigeron canadense* is frequently employed in medicine for uterine hæmorrhage. Is its reputation deserved? Where is it chiefly produced? In what proportion does the herb yield the oil? and what are its physical and chemical properties?

Referred to Dr. R. P. Thomas, of Philadelphia.

18. The taste of Dittany (*Cunila mariana*) is very like that of horse-mint (*Monarda punctata*). Does the volatile oil of the former resemble that of the latter in physical and chemical properties?

Accepted by Charles A. Heinitsh.

19. Spatulas, stirring-rods, agitators, and mechanical stirrers used in pharmaceutical preparations: their material and quality, form and construction; with critical remarks.

Referred to Thomas S. Wiegand.

20. What are the best vessels in which to dispense ointments and ce-rates, combining fitness with elegance and economy; and what is the best plan for keeping this class of preparations in the dispensing shop, so as to retard their tendency to oxidation?

Accepted by William S. Thompson, of Baltimore.

21. *Maranta cotula* and *Leucanthemum vulgare* are extensively introduced into the United States; can their flowers, as has been repeatedly asserted, be made available for destroying insects, and may they be regarded as a substitute for the so-called "Persian Insect Powder," which is derived from the nearly allied genus *Pyrethrum*?

Accepted by George F. H. Markoe, of Boston.

22. Pumpkin seeds have acquired some reputation as a remedy in tænia. Does their curative power reside solely in the fixed oil?—if so, what is the best process for extracting it, and of dispensing it for internal use?

Accepted by Charles A. Tufts, of Dover, N. H.

23. An essay on gas-heating apparatus adapted to the various purposes of the apothecary, so as to enable him to conduct his processes in or near the shop; which shall combine efficiency with economy; illustrated by figures or specimens.

Accepted by P. W. Bedford, of New York

24. Valerianate of Ammonia. The crystalline salt made by the process of B. J. Crew is apt to have adhering valerianic acid, which renders it disagreeably odorous and moist. What is the best means of obtaining a dry, neutral salt?

Referred to Charles Bullock, of Phila.

25. What is the best formula for Elixir of Valerianate of Ammonia, which shall be nearly free from valerianic odor and elegantly aromatized?

26. Is there a reliable test for the active resin from Cannabis sativa of the East Indies, whereby the genuineness of Extract of Indian Hemp may be satisfactorily and easily ascertained by the pharmacist?

Accepted by Wm. Procter, Jr., of Phila.

27. What is the best kind of press for the pharmaceutical laboratory, on a moderate scale, combining great power with simplicity and easy manipulation? and can the principle of the hydraulic press be employed?

Accepted by R. H. Stabler, of Alexandria, Va.

28. Pure tannic acid being an odorless substance, is there an odorous substance in nutgalls that is found adhering to commercial tannic acid? or is the odor very commonly noticed in that substance due to the impure ether used in its preparation?

Accepted by Wm. Procter, Jr., of Phila.

29. Owing to the proverbial difficulty in keeping garlic from growing and drying up to its detriment, and to the fact that garlic may be prepared so as to keep like other drugs, by the destruction of the vitality of the bulblets, and their partial dessication,—it is queried: Can the latter process be advantageously applied to the commercial drug? and if so, how is it effected?

Accepted by A. P. Sharp, of Baltimore.

In conclusion, the Committee will remark that they have not brought forward any questions for prizes, but are prepared to do so should the Association direct it after the reading of this Report,

WILLIAM PROCTER, JR.,
JOHN M. MAISCH,
J. FARIS MOORE,
CHARLES BULLOCK,
P. W. BEDFORD,

Committee.

The following resolutions were now presented by Edward Parrish, and, on motion, adopted :

Whereas, The mutual cultivation of science tends to break down sectional and national distinctions, and to unite all of kindred objects and pursuits in a common bond of friendship and good will; and whereas, we have learned with satisfaction of the Druggists and Chemists of Great Britain having been summoned near the same time as our present meeting, and as we believe for purposes similar to our own; therefore,

Resolved, That we view this movement on the part of our brethren of the mother country with feelings of satisfaction and encouragement, and invite their friendly co-operation and correspondence in advancing a knowledge of the science and art of Pharmacy, and in promoting the elevation of the profession to a position commensurate with the importance and dignity of its objects.

Resolved, That a copy of these Resolutions, signed by the proper officers of the Association, be transmitted to the President of said Conference of Druggists and Chemists of Great Britain by our Corresponding Secretary. who is also directed to solicit an exchange of their published Proceedings for those issued by this Association.

John Meakim presented the following resolution, which was adopted :

Resolved, That a vote of thanks be tendered by the Association to the retired President for his able administration of the duties devolving upon his office, and to the late Treasurer and Secretary for the very prompt and satisfactory performance of their respective duties.

The Chairman of the Business Committee presented the following resolutions, which were unanimously adopted :

Resolved, That the thanks of the Association are tendered to the Faculty of the University of Maryland for the use of their rooms and other accommodations so kindly furnished, and for the attention of their Janitor, during its sessions in Baltimore; and that the Secretary be directed to send a copy of this resolution to the Faculty through the Baltimore delegation.

Resolved, That the thanks of the Association are tendered to the pharmacentists of Baltimore for their hospitality, kindness and numerous attentions to the necessities of the Association and the wants of the individual members.

Edward Parrish now made some remarks expressive of the kind feeling entertained by the members generally towards the Baltimore members, who have contributed so much towards the success and satisfaction of this meeting; when, on motion, the Association adjourned, to meet in Cincinnati on the third Wednesday of September, in the year 1864.

NOTE ON POISONING BY RHUS TOXICODENDRON.

BY THE EDITOR.

There are but few of our indigenous plants more widely disseminated in the neighborhood of Philadelphia than the species of *Rhus* commonly known as poison vine. The singular fact that many persons are wholly unsusceptible to its influence is quite true, whilst others are obnoxious to its effects in various degrees, from a temporary irritation to the most virulent inflammation and eruption, is equally true. Being one of the latter class, we have often suffered the inconvenience arising from it, and used most of the remedies recommended in the books, and by non-professional experience. When the alkaline solutions, as ammonia, liquor potassæ or even pearlash are applied, immediately after exposure to the *virus*, they rarely fail to counteract its effects except in the most susceptible, but unfortunately it often happens that the victim does not suspect the nature of the irritation until it proceeds to the vesicular condition, when as it is well known, the little blisters extend slowly to the surrounding parts, appearing as pimples, colorless at first, often attended with an annoying itching sensation. In a recent attack, where the extension of the poison over the surface had been controlled by diluted liquor potassæ (1 to 2 of water) it occurred to us to try the coagulating influence of Monsel's Solution (Liq. Ferri Subsulphatis, Pharm. 1860,) and with entire success and relief. Each vesicle was punctured with the point of a penknife, and a little splinter of wood dipped first in the solution and then inserted in the vesicle. The sensation is a little smarting, but not severe, and the peculiar action of the poison is at once arrested at the base of each vesicle, which soon dries up and the irritation ceases. The scab which forms under the influence of the subsulphate, is more consistent as well as persistent, than when it is not employed, and it has a dark red color, which gives to the part a speckled appearance. The relief thus afforded when the poison is on the wrist, or on the hands where the cuticle is thick and the vesicle deep-seated, is very gratifying.

GLEANINGS FROM THE FRENCH JOURNALS.

BY THE EDITOR.

Influence of Steam on Lead.—M. Lermer, in Dingler's *Polytech. Journ.*, has published an interesting article on the corroding influence of aqueous vapor on lead pipes. This effect is found to greatly increase in proportion to the purity of the lead. By alloying the lead with tin, the action of the vapor is much reduced, and at a minimum when the lead is but 37 per cent. of the mass.—*Jour. de Chim. Méd.*

Arsenic in Sulphuret of Antimony.—An ounce of the black sulphuret of antimony was given to twenty-four sheep, of which number ten died. On examining the sulphuret by Wackenroder's process, M. Reynolds discovered 1.33 per cent. of sulphuret of arsenic.—*Jour. de Chim. Méd.*

Iodide of Iron and Quinia, crystallised.—M. Smedt believes that he has obtained this salt perfectly definite. He prepares it as follows: Take of Sulphuret of Barium a sufficient quantity. Make a concentrated solution in water, precipitate it by tincture of iodine, filter to separate the sulphur, and add 30 parts of Sulphate of Quinia dissolved in concentrated alcohol.

Sulphate of baryta precipitates and iodide of quinia remains dissolved in the alcohol and communicates to it a deep yellow color; thrown on a filter, the sulphate of baryta is washed with alcohol, the liquors, united and evaporated, yield the iodide of a beautiful orange yellow-color; lastly, 12 parts of iodine are transformed into a concentrated solution of iodide of iron, to which the alcoholic solution of iodide of quinia is added, and heated on a water bath. As the alcohol evaporates, the liquor assumes a beautiful green-color, and a small quantity of dark green resinous matter separates. Towards the end of the evaporation a little alcohol is again added, filtered, and left to crystallize; the crystals are expressed strongly and dried.

The iodide of iron and quinia obtained by this means is in long needles of a beautiful yellow-color, completely soluble in boiling water, and not precipitating on cooling. This salt dissolves in cold alcohol and ether, is without odor, and has a bitter and ferruginous taste. In fact, it presents all the characters of a

perfectly definite compound, but its composition has not been verified by analysis.—*Jour. de Chim. Méd.*, Sept. 1863.

Falsification of Essence of Mace.—M. de Letter has noticed a fraud which consists in substituting an alcoholic tincture of nutmegs for the essential oil. This product has a golden yellow-color, and is very fluid, two properties which are not characteristic of the essential oil of mace. Besides, this pretended essence mixes with water, rendering it slightly lactescent like tincture of nutmegs, which in color resembles the fraudulent essence. A few drops of the latter tested with bichromate of potassa and sulphuric acid developes instantly the green coloration due to alcohol.—*Bul. Soc. de Pharm. de Brux. et Jour. de Chim. Méd.*

Syrup of Balsam Copaiba.—M. Edward DuMay (*Jour. de Chim. Méd. Aout*, 1863) gives the following receipt for this syrup:

Take of Balsam of Copaiba, of Cayenne 167 grammes.

Calcined Magnesia,	9	“
Simple Syrup,	320	“
Yolk of Egg, fresh,	No. 4	

Triturate the yolk of eggs with the magnesia, and add afterwards and mix intimately the copaiba, and finally the syrup. This preparation keeps well.

Casein Cement.—Dr. Wagner recommends the employment of a cold saturated solution of borax or of silicate of soda, to dissolve casein in preference to the alkaline carbonate indicated by Braconnot. The solution of casein by borax is a clear liquid, of viscid consistence, more adhesive than gum, and able to replace in many cases strong glue. Stuffs of linen and cotton impregnated with this solution can be treated with tannic acid or acetate of alumina and rendered impermeable. Marsden, in his *History of Sumatra*, has shown that the chief cement employed in that country is made from curdled buffalo's milk, and called *prackee*. To prepare it, the milk is abandoned to itself until the cream becomes butter, which is removed by a spoon and washed with water for use. The residual liquid of the milk is sour and thick, and it is this that they call *prackee*. They press it strongly so as to get it into the form of cakes, which are dried

and become excessively hard. When it is to be used, a certain quantity is scraped off, mixed with quick lime in powder and moistened with milk. The cement thus obtained is extremely solid, and resists perfectly hot and humid climates a great deal better than glue; it is specially good for cementing porcelain.

—*The Technologist. Journ. de Chim Med.*

The following recipes for mineral salts have been translated from the Report of MM. Bussy, Grandeau and Baudrimont, to the Commission revising the French Codex.

Sulphate of Protoxide of Manganese.

Take of Black Oxide of Manganese (natural), 1 part.

Commercial Proto-sulphate of Iron, 1 “

By contusion and trituration make an intimate mixture and heat in an earthen crucible to ordinary redness. The mass being cooled, pulverize it and exhaust it with boiling water and evaporate to dryness. Redissolve the residue in hot water, filter and evaporate and crystallize.

This salt is very soluble in water, and should not be colored blue by yellow prussiate, nor black by sulphuretted hydrogen, after adding acetate of soda.

Chlorate of Soda.

Take of Crystallized tartaric acid, 150 parts.

Carbonate of soda, crystallized, 143 “

Chlorate of Potassa, 121 “

Dissolve the tartaric acid and carbonate of soda separately, in convenient quantities of hot water, and add little by little the solution of carbonate, to that of the acid in a capsule sufficiently large to prevent the liquid from loss by effervescence. When this last has ceased, agitation causes the deposition of the bitartrate of soda.

On the other hand, dissolve the chlorate of potassa, in twice its weight of boiling water, and mix this solution with the magma of the bitartrate of soda resting in the capsule. Carry the whole to ebullition, and add enough of water to dissolve and allow it to cool completely. Filter the liquor to separate the precipitate of cream of tartar which forms. Evaporate the filtrate, nearly to dryness, and stir it to avoid loss by decom-

position. When cold lixivate the granular salt with four or five times its weight of cold water, agitating to facilitate solution, and when there only remains a granular crystalline residue which refuses to dissolve, filter and evaporate to one-fourth, and set aside to crystallize.

Thus made, this salt ought not to blacken when heated on platina foil, and should but slightly trouble a solution of nitrate of silver. It is soluble in three times its weight of cold water. 122 parts of chlorate of potassa yield 106 parts of chlorate of soda.

Hypermanganate of Potassa.— KO , $\text{Mn}^2 \text{O}_7$.

Take of Binoxide of manganese finely pulverized and	
washed,	10 parts,
Caustic potassa, well fused,	12 “

Put them in a cast iron basin, add a little water, sufficient to render the mixture pasty, dry rapidly, stirring constantly with a strong iron spatula whilst heating over the fire, to remove all humidity; introduce the grumous mass obtained, into a tubulated earthen retort, and lute in its tubulure a large green glass tube, descending nearly to the bottom of the retort. Place the retort in the upper part of a laboratory furnace, adapt to its neck a curved tube, which should dip 2 centimetres into mercury. Pass through the tube, dipping into the retort, a current of oxygen deprived of carbonic acid gas, at the moment when the retort has attained a dull, red heat. The action is terminated when the oxygen is disengaged freely through the tube dipping in the mercury, or when it ceases to disengage watery vapor.

The retort is now cooled, emptied, and the contents lixiviated with a sufficient quantity of warm water. Pass into the liquor thus obtained, a current of washed carbonic acid, until the solution has taken the characteristic violet tint of the hypermanganate. Allow it to repose 24 hours, decant and rapidly evaporate it without ebullition to the proper degree, that, by cooling, it will make a good crystallization of hypermanganate. The mother waters are evaporated whilst they yield prismatic crystals by evaporation. They are carefully dried, avoiding the contact of organic matter.

100 parts of binoxide, yield 35 to 40 parts of permanganate in the first crystallization.

This salt is in beautiful prismatic needles, of a bronzed and violet black. It should be entirely soluble in water. Its solution of a magnificent violet becomes green by alkalis.

On oxycinchonia, an alkaloid isomeric with quinia. By M. Strecker.—The interesting relations which exist between quinia and cinchonia, as much in regard to composition as to origin and properties, have suggested to M. Strecker the idea of seeking to fix on cinchonia the oxygen necessary to make its composition that of quinia. He has succeeded; but the product is not quinia, only an isomere of that base.

The transformation has been effected by the aid of a well known process, which consists in replacing one eq. H. by Cl. Br. or I., and replacing afterwards this metalloid by HO, by means of potassa or hydrated oxide of silver.

Monobrominated cinchonia of Laurent, is boiled with water and an alcoholic solution of potassa. After a prolonged ebullition, a current of CO^2 is passed into it to neutralize the alkali. After evaporation to dryness, it is washed with water, and the residue treated with boiling alcohol, which deposits, by evaporation, colorless crystalline plates of the composition $\text{C}^{40}\text{H}^{24}\text{N}^2\text{O}^4$.

This is the formula for quinia, but it has not the properties of that base. The solutions are not fluorescent, like those of quinia, nor do they yield dalleochin by chlorine and ammonia. Its salts are with difficulty crystallizable; the most crystallizable being the neutral sulphate and oxalate.

The author has named the new base, *Oxycinchonia*.—*Annal. der Chem. & Jour. de Pharm.* Sept. 1863.

On a new kind of Cubebs.—Within a brief period, Cubebs from the Dutch East Indies have entered commerce; they are attributable to an analogous species, and are offered at a much lower price than ordinary cubebs. But they differ essentially from true cubebs, and must be considered as false and improper for medical employment. M. Pas, as well as M. Grönewegan, have examined them. The size of this cubeb surpasses considerably

that of black pepper, and is nearer that of allspice. Its color is ash-grey, approaching brownish-black, and the wrinkles on the surface are less deep and more regular than those of true cubebs, the petioles are a little flattened. The odor is less agreeable, and the taste less burning, less pungent and more like mace.

Thrown into water, the new cubeb absorbs it more rapidly, and precipitates consequently much sooner than ordinary cubebs. It colors the water deep brown, whilst true cubebs gives it but a light yellow, after several day's contact. Maceration in water softens both fruit and seed, which is not the case with cubebs.

True cubebs are difficult to powder; the false drug is easily reduced to powder. The true powder is deep brown, of an aromatic odor, whilst its congener is greyish-red with a terebinthinate odor. The volatile oil of this berry, possesses a sharp odor resembling a mixture of flower of nutmegs, lemons and oil of turpentine, and is colorless, whilst that of cubebs is thicker and greenish colored.

100 parts of true cubebs yield 21 of a greenish balsamic extract to ether, whilst in the same manner treated, the false drug gave but 10 parts of a brownish balsamic extract. M. Pas thinks this drug is the ripe fruit of *Piper Cubeba*, whilst M. Groenewegan thinks they are the product of *Piper anisatum*. *Journ. de Chim Méd. et Jour. de Ph. d Anvers.*

Tannin, its employment as a substitute for Cinchona.—Under this title, Dr. Leriche has published a memoir which received a silver medal from the Society of Medical Sciences of Brussels.

The author arrives at the following conclusions:

1. Pure tannic acid properly administered, is an excellent anti-periodic;

2. It possesses real efficacy in the treatment of all intermittent fevers of a simple quotidian type;

3. The facility of its extraction, its low price, its innocuousness, render it preferable to sulphate of quinine, or at least to the other derivatives of Cinchona.

4. It consequently unites all the qualities of a good succedaneum, and constitutes, at the present time, the best of indigenous febrifuges.—*Jour. de Chimie Médicale, Oct., 1863.*

REPORT ON THE BARK AND LEAVES OF CHINCHONA
SUCCIRUBRA GROWN IN INDIA.

BY J. E. HOWARD, Esq.

To the Under-Secretary of State for India.

Sir,—I have the pleasure of reporting that the specimens of Chinchona bark and wood, together with dried leaves and decoction made from the same, reached me in good order on the 23d of May last, and that I have since submitted them to careful examination.

The appearance of the bark indicates that it has been gathered and dried under favorable circumstances. It is full of sap, which, in some cases, exudes a little at the cut ends, and forms what is called a resinous ring or circle. The specific gravity is considerable, and the thickness, especially of the fifteen months old bark, is remarkable for the time of growth, being about one-tenth of an inch in some of the quills, which curl much in upon themselves in drying. The external surface is warty, and the color more of a tea-green than is usual in the bark as it is imported from South America; but, as it is not cut there at so early a stage of growth, it is difficult to form an accurate comparison in this respect. The taste is that of "red bark," being compounded of the bitter of the alkaloids and the more nauseous taste of kinovic acid. The powder resembles that of good Peruvian bark.

In order to make the best analysis of the small quantity of bark at my command, I commenced with 500 grains of that of the second year's growth, and was able to obtain therefrom a first and second crystallization of white sulphate of quinine. By thus specifying the whiteness, I mean to imply that the bark had not the commercial disadvantage which frequently attends the "red bark" at a more mature stage of growth, resulting from the fact that the coloring matter has in these last become so much implicated with the alkaloids as to make the task of purification a difficult one. The crystallizations I obtained were mixed with some sulphate of chinchonidine, which is commercially (but not medicinally) a disadvantage, and

one which always attends the products of "red bark." I also obtained chinchonine and other usual products of the process as from South American bark, viz. kinovic acid, kinate of lime, gum, chinchona red, etc. The product of alkaloid in a rough state was estimated at 4.30 per cent. A second trial of the same quantity enabled me to decide more accurately the percentage product in *purified* alkaloids. I found the total contents 3.30 to 3.40 per cent., and of this (soluble in ether) Quinine and some Chinchonidine, 2.40 per cent. leaving .60 per cent. of Chinchonine, which crystallized freely, and also .30 or .40 loss, chiefly in water of the hydrated alkaloids. This result must be considered extremely favorable.

I have noticed the product of some fine quills of South American red bark as 3.60 per cent.,* the larger bark of the same parcel producing 3.91 of alkaloid. Dr. Riegel obtained from one ounce red bark, the best quality, 4.16 per cent. by Rabourdin's process, or 3.90 by that of Buchner. Of this 2.65 per cent., soluble in ether, was reckoned as Quinine, and the rest was set down as Chinchonine.† I have obtained a much higher percentage of alkaloid from large and peculiarly fine "red bark," but I see no reason to doubt that even this higher percentage would be attained in the East Indies, if time were allowed for the growth.

The exact period at which it would be advisable to cut the bark must be ascertained by experiment; but I think this should take place as soon as the bark attains to a thickness which would repay the cultivation. There would be positive disadvantage in allowing the bark to attain such an age as is indicated by many of the specimens from South America, if the object to be attained is the extraction of the alkaloids; since there is a continual process of deterioration‡ of these after a certain period of the history of the bark, which is connected with the oxidation of the red coloring matter,

* 'Illustrations of Nueva Quinologia,' under head *C. succirubra*, p. 15.

† 'Pharm. Central-blatt,' for July, 1852.

‡ Described in my 'Illustrations of Nueva Quinologia,' under head *C. succirubra*, p. 14.

and the production, in very old trees, of those fine descriptions of bright red bark which command indeed a high price in the market (as much at the present time as eight shillings per pound,) but which would not, in many cases, be more valuable for the production of Quinine than bark of one year's growth.

I next examined the younger bark of one year's growth, taking care to select the most mature portion, and found that it yielded 2.59 of alkaloid, of which 2.55 (soluble in ether) appeared to be Quinine and Chinchonidine, and in part crystallized into tolerably white sulphate, which showed perhaps a rather larger proportion of Chinchonidine than in the older bark. On the other hand, the proportion of Chinchonine seemed notably less, viz. only 0.04 per cent.; but it is possible that the separation was not exactly effected between the Chinchonine and Chinchonidine, which is not easily accomplished by ether in such small portions.

The above result induced me to pay further attention to the leaves, concerning which the absence of any carmine sublimate by heat led me at first to an unfavorable conclusion. The decoctions and infusions made by Mr. M'Ivor, though in perfectly good condition, showed that the contents changed most rapidly under the influence of the oxygen of the atmosphere as soon as ammonia was added to the, at first, decidedly acid liquor. Fortunately, a good supply of several ounces of dried leaves had been sent over, and from these I succeeded in obtaining Quinine, though in very small quantity, but presenting its usual characteristics, dissolving in acids and precipitated by alkalis as a whitish hydrate, soluble in ether, and left by this evaporation as a resinous-looking body, having the usual bitter taste, also crystallizing not only as a sulphate, but as an oxalate of Quinine (the latter being the more critical test); but nevertheless presenting a characteristic implication with resinous or extractive matter, such as is usually met with in the very smallest quills or *canutillos* of South American bark, in analysing which it is frequently difficult to purify the Quinine from this adhesion. I obtained first from these leaves to the extent of 0.11 of alkaloid, of which part was soluble in ether,

the remainder in spirits of wine, and afterwards 0·19 of precipitate still more combined with astringent matter. From these data, it seems to follow that the leaves will not supply a material for the extraction of Quinine, but that they will, nevertheless, be very useful when used fresh or recently prepared decoction or infusion for the cure of the fevers of the country. To this end, the abundance of kinovic acid they contain, equal (weighed in the rough state) to 4·20 per cent., may also conduce.

I have not much to remark to the No. 3 (bark renewed over spaces previously cut,) as the quantity sent was too small for much chemical examination, but I obtained abundantly by heat the crimson sublimate which marks the presence of alkalis, and the promise from the external characteristics was good. The No. 4 (bark covered up with moss for some months) seems to me a successful experiment of Mr. M'Ivor's, especially since I notice very abundantly in this bark the crystals of kinovate of Quinine, which I have described* as I found them in the "red bark" of South America, and now find again, quite as plentifully, in the older bark sent from India. I may add that generally speaking, the structure of the barks, as shown by the microscope, makes it evident that the plants had grown vigorously and under circumstances favorable to their full development.

I reserve any opinion as to the best method of drying the bark, to which Mr. M'Ivor alludes, till I have had the opportunity of examining further specimens.

I have the honor to be, Sir, your obedient servant,
June, 1863.

JOHN ELIOT HOWARD.

Lond. Pharm. Journ., Aug., 1863.

QUININE, CHINCHONIDINE, AND CHINCHONINE, IN THE LEAVES OF CHINCHONA SUCCIRUBRA.

A few remarks of a technically scientific nature on some points which struck my attention in making the investigation detailed in my official report on the red bark grown in South

* 'Illustrations of Nueva Quinologia,' Mic. Obs., p. 7.

India, may not be unacceptable. The discovery of Quinine, Chinchonidine, and Chinchonine, in the leaves of the *Chinchona*, seems to confirm the views which I have expressed as to the production of the alkaloids by a reaction taking place between the mother-substance found in the heart-wood and carried up into the leaves by the circulation of the sap, and the ammonia which, according to the observations of De Vry, is present in in every part of the plant. This mother-substance, forming a yellow solution in ether, separates in a flocculent mass by the addition of quinine, and the semicrystallization thus induced formed on recrystallization the crystals which I have described and figured as similar to those found *in situ* in the bark itself. The Chinchona-red appears to be formed at the same time, and colors the flocculent mass reddish, or rather pink. I find in the leaves abundance of kinovic acid, which, separated from adherent chlorophyll, becomes perfectly white and similar to that obtained from the bark; they also yield much wax and kinate of lime, together with gum. In order to check or confirm the trial of the leaves, I also examined with similar results the hollow square stalks (received, with other parts of the tree, from Ecuador) just below the insertions of the leaves. This gave a similar but rather less minute quantity of quinine, and also of an alkaloid not soluble in ether. I conclude that the process of the formation of the quinine goes forward still in the bark, though begun in the leaves, and continues to increase with the increasing maturity of the bark, undergoing afterwards the deterioration above spoken of. If such be at all the process, the alkaloids must be found in the sap itself; and if the quinine be formed in the leaves, in which there are certainly no liber-fibres, it seems to me to dispose of the hypothesis that these latter are in some way *essential* to the formation of the alkaloids. The above discovery also coincides with the presence of quinine (as I have shown) very eminently in the cellular tissue of the outer bark, which is evidently, in the barks under consideration, gorged to repletion with sap. Reserving any remarks on the microscopic peculiarities in these East In-

dian barks for some further occasion, I remain, yours, etc.—
JOHN ELIOT HOWARD. *Lond. Pharm. Journ. Aug. 1863, from
the Journal of Botany.*

A CRYSTALLINE PRINCIPLE DERIVED FROM THE EUONYMUS EUROPÆUS.

By M. KUBEL.

This principle is found in the cambium of the *Euonymus europæus*. The larger branches are selected in the spring; the green external bark is removed; the under layer is then scraped off with a knife until the wood is reached, and the scrapings macerated in strong alcohol. This tincture is allowed to stand half an hour, then expressed, and left to spontaneous evaporation. Crystals are deposited, which greatly resemble those of mannite. A second crystallization from alcohol and treatment with animal charcoal, yield them in a state of purity. The substance thus obtained is in small crystals consisting of microscopic needles, derived from an oblique rhombic prism. Insoluble in absolute alcohol and in ether, they are dissolved by cold, and are very soluble in hot water. The solution has no action on litmus paper, and does not appear to alter a ray of polarized light. The crystals contain no water of crystallization, and do not lose weight even at 110° Cent.; at 182° Cent. they fuse, and again solidify on cooling. The substance burns with an odor of caramel when ignited on platinum foil; it does not reduce tartrate of copper, even after ebullition with sulphuric acid, but it reduces the salts of silver.

All these characters, except the crystalline form and the fusing-point, accord with those of mannite. The centesimal composition is also the same, $C_{12}H_{14}O_{12}$. From the difference in crystalline form and fusing-point of the two substances, the author does not admit their identity, but gives the name of "euonymite" to the new product.—*Lon. Pharm. Jour. Feb. 1, 1863, from Journal Prakt. Chem.*

ON THE ESTIMATION OF TANNIC ACID.

BY DR. D. W. GERLAND.

The importance of a reliable and easy method for the estimation of tannic acid as a means of determining the value of tanning materials has been duly noticed, and a great number of processes described for that purpose. An examination of these methods, induced by numerous samples sent to me for analysis, has convinced me that those recommended fail in answering the desired end, as some yield too high a percentage of tannic acid by the accompanying gallic acid being estimated as tannic acid, some giving altogether incorrect results, whilst others are too complicated to be of service to any but the skilled chemist.

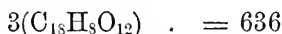
After a long experience, I have found that the estimation of tannic acid is accomplished with great accuracy and speed as tannate of antimony precipitated by a standard solution of tartar of antimony, if the operation is conducted in the following manner:

The solution of tartar emetic I prefer of such strength that 1 CC will precipitate 0.005 grammes tannic acid.

1 equivalent tartar emetic, dried at 100°



requires 3 equivalents tannic acid

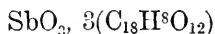


to form 1 equivalent tannate of antimony,



Accordingly, 0.002611 grammes tartar emetic will precipitate 0.005 grammes tannic acid of galls, and therefore 2.611 grammes tartar emetic dried at 100° C. are dissolved in 1000 CC water, each CC of which solution is then equal to 0.005 grammes tannic acid. This liquor, added to a dilute solution of tannic acid, produces no change, but if a solution of chloride of ammonium is mixed with the latter, the tannate of antimony appears as a thick, curdy precipitate, which, after stirring, settles readily, leaving the supernatant solution perfectly clear, so that it is easy to perceive whether another drop of the antimonial liquor

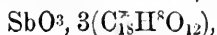
will again cause a precipitate. Its voluminous and opaque character makes it very perceptible to the last, so that I found less difficulty in observing the end of this reaction than with the usual estimation of sulphuric acid by a standard solution of chloride of barium. If as much and no more of the tartar solution had been added as will cause a precipitate in the sample, the filtrate of the same will be found free from both antimony and tannic acid, and the precipitate after filtering, washing, and drying, at 100°C ., consists of pure tannate of antimony of the formula—



and contains all the tannic acid of the original liquor. Any gallic acid that might have been present in the tannic acid is not precipitated under these circumstances, and consequently does not interfere with the estimation of tannic acid; for the ammonia salt, whilst it renders the tannate of antimony insoluble, keeps the gallic acid in solution. Nor do the coloring matter and other impurities extracted by water from the tanning materials affect this process. It is, however, to be observed that the reaction of the liquor is neutral or slightly acid. The number of CC of the standard solution used will therefore, when multiplied by 0.005, give the exact amount of tannic acid in the sample, or the percentage, if 0.5 grammes were employed.

To illustrate the exactness of the method, I add a few of my experiments :

No. 1. 0.5 gramme commercial tannic acid of galls was dissolved in 100 CC of water, of which 30 CC were mixed with a solution of chloride of ammonium, and diluted with water to about 200 CC. After having added 29.1 CC of the standard solution, the filtered liquor was free from tannic acid, showed a slight reaction of antimony, and contained gallic acid. The precipitate, thrown on a weighed filter, and after washing with water dried in the water-bath, weighed 0.1791, and was found to contain 18.01 per cent. oxide of antimony. The formula—



requires 18.13 per cent. The sample therefore contained, according to the quantity of standard solution used,—

97.0 per cent. tannic acid,

calculated from the amount of precipitated tannate of antimony—

96.24 per cent. tannic acid.

No. 2. 10 grains of oak bark, finely divided, were extracted with hot water, the filtered solution diluted to 500 CC, of which 50 CC were, after further dilution with water and addition of chloride of ammonium, tested in the same manner. The amount of standard solution of antimony used for precipitation was 12.51 CC, the weight of the washed and dried precipitate was 0.1563 grammes, containing, according to calculation, 0.1257 grammes tannic acid. The percentage of oxide of antimony in the precipitate was found equal to 18.07 per cent.

No. 3. Dried valonia extract was treated in the same manner. 0.5 grammes required 38.8 CC of the antimony solution. The percentage of tannic acid calculated from the weight of the precipitated tannate of antimony was 38.92.—*Chem. News*, Aug. 1, 1863.

Chemical Laboratory, Macclesfield, July, 1863.

ON THE TRANSFORMATION OF ARSENIC INTO A SOLID HYDRIDE UNDER THE INFLUENCE OF NITRIC ACID.

By DR. BLONDIOT.

It is well known that when more or less diluted acids disengage the hydrogen of water in the presence of zinc or iron, the nascent gas, if in contact with a soluble compound of arsenic, forms with the latter a gaseous hydride having the formula AsH_3 . But to this general fact there is one exception, which I desire to call attention, inasmuch as it may have great importance in toxicological researches. Nitric acid and its derivatives under the conditions named, only produce a solid hydride, having the formula As_2H , which is precipitated upon the zinc in the form of brown flocculi.

This characteristic reaction is evidently due to the formation of a certain quantity of ammonia, and is produced, even when

the nitric acid is mixed in very minute proportions with other acids, so that we may avail ourselves of the reaction to detect the least trace of a nitrous compound in sulphuric, hydrochloric, or other acids. When once formed, however, the solid hydride of arsenic is insoluble in the cold in sulphuric and hydrochloric acid, whether concentrated or diluted, and therefore gives no trace of the gaseous hydride in Marsh's apparatus. Of this fact I have repeatedly assured myself by placing in the apparatus strips of zinc previously coated with the hydride in question.

For the production of this solid hydride to take place, however, the author states that the absence of all other metals from the solution is necessary. And not only this: the presence in the liquid of certain organic matters, such as sugar, gum, gelatine, alcohol, ether, even in small proportion, prevents the formation of the hydride. Nevertheless, he adds, the property possessed by arsenic of depositing itself on zinc, as a hydride in the presence of nitrous compounds, affords us the means, if not of isolating, at least of characterising it. If arseniuretted hydrogen is passed into nitrate of silver, as in Lassaigne's test, and the excess of silver is precipitated by chloride of sodium, the clear liquor obtained by filtration, acidulated with a few drops of nitric acid, will quickly deposit the hydride on a strip of pure zinc. The author affirms that this reaction is second to none in sensibility.

Hitherto, sulphuric and hydrochloric acids have been considered sufficiently pure for toxicological researches when proved to be free from arsenic; but the author's results show that it is equally important to have these acids free from nitrous compounds. Another source of error exists when animal matters suspected to contain arsenic are carbonised by a mixture of sulphuric and nitric acids. If the whole of the nitric acid is not got rid of, there is the danger that when the liquid obtained is tested by Marsh's method the whole of the arsenic may pass into the solid hydride and remain undetected.—*Chem. News*, Aug 1, 1863. Condensed from *Annales de Chimie et de Physique*, t. lxxviii, p. 186.

ON FERMENTATION AS A CAUSE OF VARIOUS DISEASES.

BY M. POLLI.

M. Polli, of Milan, has recently published two very interesting memoirs on fermentation as a cause of various diseases, from which we extract some of the more important facts.

Chemists who have, of late years, investigated with the greatest success the phenomena of fermentation, have observed that this mode of reaction amongst organic principles has a much greater importance than was suspected. It is, in fact, to fermentation that the spontaneous decomposition of animal and vegetable tissues is due, such as gangrene, dry-rot, eremacausis, etc., and the whole series of successive transformations that organic substances undergo until they are converted into water, carbonic acid, ammonia and mineral matters. It is by fermentation that fatty bodies give glycerine; that salicine furnishes glucose; that myronate of potash is converted into essential oil of mustard; that neutral substances, such as urea and allantoin, form ammonia; that amygdaline produces the poisonous substances, oil of bitter almonds and hydrocyanic acid.

Ferments act by contact or by catalysis. Sometimes they are living creatures, sometimes very active substances which are not organized. Diastase, emulsine, and pepsine perform the part of ferments. They may cause organic substances to double, become hydrated, or isomeric.

According to M. Polli, there exists a great analogy between the processes of fermentation and many organic metamorphoses which occur in some diseases. An albuminous matter which in a particular state of alteration acts as a ferment, and particular substances which proceed from its action, this is the basis of the humoral theory.*

But analogy is not sufficient of itself; it has been shown by carefully conducted experiments that the blood in disease undergoes alterations and variations in its composition, and that arti-

* According to M. Pasteur, ferment is not albuminous matter altered by oxygen, but an organized being, the germ of which is brought by the air. The presence of albuminous matter is an indispensable condition of all fermentations, because such substances are necessary to the production of the ferment.

ficial disease may be produced bearing a strong resemblance to natural disease, by injecting into the blood-vessels substances which act as ferments. Multiple abscesses, induced by the injection of pus into the veins of dogs; septic affections caused by injecting purulent putrid matters into the veins of animals; diseases presenting all the characteristics of typhoid fever, and caused by the injection of putrefied blood into the circulating current; finally, contagious diseases, such as glanders, which is produced by the injection of glanderous humours, are facts which prove that a general affection may be induced by the simple introduction into the blood of a substance capable of acting as a ferment. The diseases which may be called catalytic, in which the morbid matter produces metamorphoses by contact with the alterable principles of the blood, are the primary cause of all the symptoms presented by the animal economy. In short, it is impossible to deny that fermentation may be produced in the blood.

But, admitting that the starting-point of many diseases is the action of a specific ferment in the blood, is it possible to prevent its effects, to render it inactive in the living organism, as we may do apart from the body, by many chemical means? This is the great point which gives interest to this pathological question.

M. Polli believes that he has proved, by a series of facts and conclusive experiments, that it is possible to neutralize morbid ferments in the blood of animals by chemical substances which do not act in a manner incompatible with life; and it is by these substances that we must hope to treat successfully those diseases, of which fermentation is the primary cause.

It is well known that sulphurous acid gas prevents alcoholic and acetic fermentation, and also the fermentation of animal substances and organic matters in general. Thus it arrests, if it be already begun, the fermentation produced by saliva and diastase in contact with starch, the fermentation which myrosine induces in the paste of black mustard flour, that which is produced by emulsine on the amygdaline of bitter almonds, etc.

M. Polli has proved that alkaline or earthy sulphites possess the same antiseptic and decolorizing properties. This is

a very important fact, since it admits of the application of sulphurous acid in therapeutics. He thinks also that he has ascertained that the action of sulphurous acids and of sulphites on coloring matters, as well as on ferments, is neither a deoxygenation, a combination, nor a destruction, but simply a molecular modification.

This mode of action of sulphurous acid and sulphites explains the valuable property which these chemical compounds possess of preventing or energetically arresting the action of morbid ferments artificially introduced into the blood of animals, without altering its composition in such a manner as to be incompatible with life.

From a great number of experiments made upon dogs and alluded to in his memoirs, M. Polli has determined the safe and efficacious dose of sulphites for internal administration, the changes which they undergo in the organization, and their curative action in the affections produced by the injection of putrid or contagious matters into the blood.

The following are some of his experiments, selected from those of the last-mentioned series :

1. Ten grammes of sulphite of soda were given to a dog during a period of five days, then one gramme of pus was injected into the femoral vein. The animal became dull, and refused the food which it was offered, but the next day its spirits returned and it ate willingly. Two days after, the same experiment was repeated and was followed by the same results. At the end of a few days the animal was perfectly cured.

2. One gramme of pus was injected in two portions into the veins of a dog, of a more robust nature than that operated upon in the preceding experiment. The animal became spiritless, but the next day took some food ; the following day it was very low, it breathed with difficulty, its wounds were sanious, its left leg and foot swollen, and it died ten days afterwards.

3. An equal quantity of putrid blood was injected into the veins of three dogs ; one died five hours after the infection, another after five days of illness, and the third, to which some sulphite of soda had been administered, after having experienced some trifling symptoms of illness, rapidly recovered.

4. Numerous other experiments made with putrid blood and morbid mucus proved that the animals died with all the symptoms of a general infection, whenever sulphite of soda was not administered, and that, on the contrary, they speedily recovered, under its influence.*

If these facts should be confirmed by other experiments, M. Polli will have rendered an inestimable service to therapeutics, and will have thrown some light on the yet obscure cause of numerous diseases.—*Pharm. Journ. and Trans., Lond., April, 1863, from Journal de Pharmacie et de Chimie.*

SUBSTITUTES FOR WAX.

BY BARNARD S. PROCTOR.

In the January number of the CHEMIST AND DRUGGIST for the current year, I published a short paper drawing attention to the adulteration of white wax: this present paper follows as a natural sequel to the former, and is designed to indicate the relative merits of various substances which may be considered suitable for replacing wax in one or other of its uses. With regard to the fitness or otherwise of any of these substitutes to take the place of wax for medicinal purposes, I shall say nothing, such a substitution being both unnecessary and illegitimate. It is also unnecessary to say anything with regard to their fitness for making candles, &c., that being unimportant to the Chemist and Druggist. But for perfumery purposes, for the polishing of furniture, and the "waxing" of thread, substitutes may with advantage be looked for; and the fitness for any of these purposes will indicate pretty well the fitness of the material in hand for other special purposes, which it would add too much to the length of the present paper to notice in full. I have also indicated the prices (quoted a few months ago, and, of course, subject to variation), and the melting point.

Spermaceti is too well known to call for any remark; stearine and paraffin greatly resemble it when pure, but the former is

* For a notice of the sulphites tried by Professor Polli, see the current volume of the "Pharmaceutical Journal," p. 37.

subject to a greasy, rancid odor, and the latter to the odor of coal tar ; they are both more crumbly than spermaceti, the paraffin especially, being readily rubbed to powder, and both are purely white. China and Japan wax greatly resemble good block white wax in their general appearance, but are liable to become coated with a fine white efflorescence resembling the bloom upon many kinds of fruit ; they have a toughness somewhat inferior to wax, and when a knife is forced into them, they break with a crackling sound ; they are both almost destitute of odor, and what they have is not objectional : of the two, the Chinese wax most nearly resembles the product of the bee.

Carnauba wax, on the other hand, differs greatly from all the others. It is hard, brittle, and darker colored than the others ; in physical properties it seems to hold a position between white wax and sulphur ; it takes a fine polish when rubbed with any soft material, and is so hard as not to take finger-marks with the heat of the hand ; it is suitable for furniture polishes, either alone or mixed with Japan wax or beeswax,

TABLE OF WAX SUBSTITUTES, SHOWING THEIR COMPARATIVE MERITS AND PRICES.

	For Thread.	Furniture.	Perfumery.	Melting Pt.	Price.
					s. d.
Genuine Block White Wax, .	Good	Good	Good	145°	2 10
White Cake Wax, adulterated	Medium	Medium	Good	..	2 4
Jamaica Yellow Wax.....	Good	Good	Good	..	1 10
English ditto.....	Good	Good	Good	..	2 1
Spermaceti.....	Bad	Bad	Good	112°	1 5
Stearine.....	Bad	Bad	Good	144°	1 4
*Tree Wax, Japan.....	Med. Good	Medium	Good	115°	0 10
*Insect Wax, China.....	Med. Good	Medium	Good	118°	2 8
*Carnauba Wax.....	Bad	Good	Bad	192°	0 10
Paraffin.....	Med. Bad	Bad	Bad	131°	1 5

* In original packages of about 1½ cwt. each. I am indebted to Messrs. Hodgkinson, Tonge, and Stead, upper Thames street, for samples and quotations.

The quality of some of these materials is subject to considerable variation thus, paraffin may be obtained quite free from odor ; and if so, might possibly be used without disadvantage in the preparation of cold cream or pomades. It is probable that there are other variations besides odor and color, judging from the melting points. Miller quotes the melting point of paraffin as 110° : I found it melt at 133°, and congeal at 103°. China wax he states to melt at 182° : I found it melt at 133°,

and congeal at 103° . Japan wax I found melt at 128° , and congeal at 102° ; the melting point quoted on the table being the mean of the two observations.

The melting point of stearine is liable to vary from very slight causes (see Miller's Chemistry); but so great a discrepancy as indicated above for China wax must surely be the result of a difference in the nature of the sample. The price quoted for Japan wax seems much below what its good properties would seem to justify. The qualities would probably become more uniform, and the prices would find a more reasonable level, if more extensive trial were made of these materials for the various purposes for which wax is at present used.—*Chem. and Druggist*, Aug. 15th, 1863.

ON THE REDUCTION OF CHLORIDE OF SILVER.

MM. Millon and Commaille have communicated to the French Academy an extremely elegant reaction, by which absolutely pure metallic silver may be precipitated from its ammoniacal combinations, with all the accuracy necessary for rigid analysis, and in such a division as to render it available in the arts.

The reagent employed is ammonio-subchloride of copper. When this substance is added to ammonio-nitrate or ammonio-chloride of silver, the whole of the silver is at once thrown down in the metallic state as a grey amorphous precipitate. The precipitate readily assumes a metallic lustre under the burnisher, and may be applied to the surfaces of wood, stone, etc. The reaction takes place so perfectly, that it may be employed either for the estimation of silver, or for the analysis of a mixture of sub- and protosalt of copper; every atom of silver thrown down representing one atom of sub-chloride of copper.

It is, however, especially valuable for reducing the chloride of silver residues of the laboratory. These are dissolved in ammonia, and the ammoniacal subchloride of copper added, when the metallic silver is at once obtained in its purity. Moreover, it is only necessary to digest the filtrate with a little powdered zinc in a closed flask, in order to again reduce the copper salt, and it is ready for a fresh operation. In this way, the same quantity of copper solution suffices for an indefinite number of precipitations.—*London Pharmaceutical Journal*, August, 1863.

ON THE PHYSIOLOGICAL PROPERTIES OF NITROBENZOLE AND ANILINE.

BY HENRY LETHERBY, M.B., F.L.S., ETC.

It is on record that Thrasyas, the father of botany, was so skilled in the preparation of drugs, that he knew how to compound a poison which would remain for days in the living body without manifesting its action, and would at last kill by a lingering illness. Theophrastus speaks of this poison, and says its force could be so modified as to occasion death in two, three, or six months, or even at the end of a year or two years. The writings of Plutarch, Tacitus, Quintilian, and Livy, are full of instances of what seem to be this kind of slow and occult poisoning. In fact, until recently there has been a common belief among the unlearned that a skilful poisoner could so apportion the dose and combinations of certain subtle agents that he could destroy the life of his victim with certainty, and at the same time measure his allotted moments with the nicest precision, and defy the utmost skill of the physician and the chemist. Even so late as the sixteenth century this belief was shared by the learned of the medical profession; for we are told, in Sprat's "History of the Royal Society," that among other questions which were drawn up by the earlier Fellows to be submitted to the Chinese and Indians was, "Whether the Indians can so prepare that stupefying herb, *Datura*, that they make it lie several days, months, years, according as they will have it, in a man's body without doing him any hurt, and at the end kill him without missing half an hour's time?"

Modern toxicologists have long since discarded these notions, and have set them down to the vague fears and exaggerated fancies of the ancients, rather than to the sober contemplation of facts. But the account which I am about to give of the physiological properties of nitrobenzole will show that there is one substance, at least, which realizes to a great extent the extraordinary opinions of the ancients. This compound may be given to-day, and yet, if the dose be not too large, it shall not manifest its action until to-morrow or the day after, and shall then destroy life by a lingering illness, which shall not only defy

the skill of the physician, but shall also baffle the researches of the medical jurist. These facts are so remarkable, that they would be hardly credited if they were not susceptible of the proof of demonstration. They are likewise the more interesting and important from the circumstance that nitrobenzole is now a common article of commerce, and is accessible to every one.

In every manufactory where nitrobenzole and aniline are prepared on a large scale, the peculiar narcotic effects of these poisons are often observed. The vapors escaping into the atmosphere are breathed by the workmen, and cause distressing headache and a heavy, sleepy sensation. For the most part these effects are not serious, but are quickly relieved by fresh air and a mild stimulant, as a glass of brandy-and-water. Now and then, however, the workmen, from carelessness in their habits, expose themselves to the action of comparatively large quantities of these poisons, and then the effects are most dangerous. Two fatal cases of poisoning by nitrobenzole have been referred to me by the coroner for investigation during the last two years, and in both instances they were the results of careless manipulation. In one case a man, forty-three years of age, spilt a quantity of the liquid over the front of his clothes, and he went about for several hours in an atmosphaera saturated with the poison. In the other, a boy, aged seventeen years, received a little of the liquid into his mouth while sucking at a siphon. The effects were nearly the same in both cases, notwithstanding that in one the poison was inhaled, and in the other it was swallowed. For some time there was no feeling of discomfort beyond that of drowsiness; gradually, however, the face became flushed, the expression stupid, and the gait unsteady,—the sufferers had the appearance of persons who had been drinking. Little by little this stupor increased, until it passed into profound coma, and in this condition they died. The progress of each case was much the same as that of slow intoxication, excepting that the mind was perfectly clear until the coming on of the fatal coma. This was sudden, like a fit of apoplexy; and from that moment there was no return of consciousness or of bodily power,—the sufferer lay as if in a deep sleep, and died without a struggle. The duration of each case was nearly the same; about four hours elapsed from the

time of taking or inhaling the poison to the setting in of the coma, and the coma lasted for about five hours.

After death there were no appearance of convulsions, but rather of narcotism and apoplexy. The face was flushed; the lips were livid; the superficial vessels of the body, especially about the throat and arms, were gorged with blood; the dependent parts were turgid; the blood was everywhere black and fluid; the lungs were somewhat congested; the cavities of the heart were full; the liver was of a purple color, and the gall-bladder distended with bile; the brain and its membranes were turgid, and in the case of the man there was much bloody serosity in the ventricles. Analysis discovered the existence of nitrobenzole in the brain and stomach, and also of aniline.

These effects were so remarkable, that I determined to examine them still further by experiments on domestic animals. Dogs and cats were submitted to the action of from thirty to sixty drops of nitrobenzole which had been well washed with dilute sulphuric acid and water to free it from every trace of aniline. The poison was generally administered by pouring it into the mouths of the animals, but sometimes it was given by means of an œsophagus-tube. When the nitrobenzole had come into contact with the mouth, it always caused discomfort, as if from unpleasant taste, and there was profuse salivation. Its local action on the stomach, however, was never very great, for there was rarely any vomiting until the setting in of nervous symptoms, and this seemed to be due to sympathy rather than to any local irritation of the stomach. Two classes of effects were clearly observed; there was either the rapid coma which characterized the operation of the poison on the human subject, or there was a slow setting in of paralysis and coma, after a long period of inaction.

When the effects were speedily fatal, the animal was soon seized with giddiness and an inability to walk. The weakness of the limbs first appeared in the hind extremities, and was manifested by a difficulty in standing; but very soon it extended to the fore legs, and then to the head and neck. There was complete loss of voluntary power. The animal lay upon its side, with its head drawn a little back, and with its limbs in constant motion, as if in the act of walking or running. The

muscles of the back were occasionally fixed in spasm, and every now and then the animal would have a sort of epileptic fit. It would look distressed, would howl as if in pain, and would struggle violently. After this it would seem exhausted, and would lie powerless. The pupils were widely dilated, the action of the heart was tumultuous and irregular, and the breathing was somewhat difficult. For some time, however, the animal retained its consciousness, for it would look up, and wag its tail when spoken to; but suddenly, and often at the close of a fit, it would become comatose,—the eye would remain open, but the conjunctiva would be insensible to touch, and the movements of the limbs would nearly cease; the breathing would be slow and somewhat stertorous, and the animal would appear as if it were in a deep sleep. This condition would last until it died,—the time of death varying from twenty-five minutes to twelve hours after the administration of the poison.

When the action of the poison was slower, there was often no visible effect for hours or days. At first there was always a little discomfort from the taste of the poison, but this soon subsided, and then for a day or more the animal appeared to be in perfect health. It would go about as usual, would be quite lively in its movements, would eat its food heartily, and in fact would seem to be in no way affected by the poison. Suddenly, however, it would look distressed, it would have an attack of vomiting, and it would tumble over in an epileptic fit. When this had subsided, it was generally found that the animal was weak, or even quite paralysed in its hind extremities; and after two or three of such attacks, the loss of voluntary power would extend to the fore limbs. The animal would lie upon its side perfectly helpless, and then the progress of the case was much the same as that already described, except that it was considerably slower. Consciousness, for example, would be retained for days after the animal was paralysed, and, although it was quite unable to stand, it would take food and drink when they were put into its mouth. The condition in which it lay was most distressing: the look was anxious and full of fear; the limbs were in constant motion; and every now and then there would be a violent struggle, as if the animal was in a fit, or was making fruitless efforts to rise. This would last for days, and then

there would be either a gradual restoration of voluntary power with complete recovery, or death from exhaustion. The time that elapsed from the administration of the poison to the coming on of the first symptoms, namely, the epileptic fit, varied from nineteen hours to seventy-two, in most cases it was about two days, and the time of death was from four to nine days.

The *post-mortem* appearances were nearly the same in all cases, whether the death was quick or slow. The vessels of the brain and its membranes were extremely turgid; the cavities of the heart were full of blood; the lungs were but slightly congested; the liver was of a deep purple tint, and the gall-bladder distended with bile; the stomach was natural, without sign of local irritation; and the blood all over the body was black and uncoagulated. Whenever the progress of the case had been quick, and death had taken place within twenty-four hours, the odor of the nitrobenzole was clearly perceptible in the stomach, the brain, and the lungs; and there was always unmistakable evidence of the existence of aniline in the organs of the body. In the slower cases, the odor of the poison had often entirely disappeared; but generally there were distinct traces of aniline in the brain and urine, and sometimes in the stomach and liver; occasionally, however, no poison was found.

It has appeared to me that the facts which are here elucidated are very remarkable; for they not only indicate a rare circumstance in toxicology, namely, that a poison may be retained in the system for many days without showing its effects, but also that the poison may be changed into an entirely different substance. The importance of these facts cannot be overrated; they are alike interesting to the chemist, the physiologist, and the medical jurist; for without dwelling on a very possible occurrence,—namely, the criminal administration of this poison, with the knowledge that the effects would be delayed, that the symptoms would correspond to those of natural disease, that the progress of the case would be lingering, and that there would be either no discovery of poison in the body, or the discovery of a thing different from that administered,—it will be manifest that the study of these facts by the medical jurist is of public importance. To the physiologist they are also interesting, inso-

much as they indicate a reducing power in the animal body by the conversion of nitrobenzole into aniline. I have endeavored to ascertain whether this is due to a living or a dead process. In the first place, I find that dead and decomposing organic matter will effect the change alluded to; for when nitrobenzole is placed in the dead stomach, or is kept in contact with putrid flesh for several hours, there is a partial reduction of it into aniline. This may be the source of the poison found in the dead body; but, on the other hand, there is a great similarity in the physiological effects of nitrobenzole and those of aniline.

When aniline is given to dogs and cats in doses of from twenty to sixty drops, it causes rapid loss of voluntary power. The animal staggers in its gait, looks perplexed, and falls upon its side powerless. Its head is drawn back, the pupils are widely dilated, there are slight twitchings or spasms of the muscles, the breathing is difficult, the action of the heart is tumultuous, and the animal quickly passes into a state of coma. From this it never recovers, but remains upon its side as if in a deep sleep, and so dies in from half an hour to thirty-two hours.

The *post-mortem* appearances are much the same as the last: the brain and its membranes are turgid, the cavities of the heart are nearly full of blood, the lungs are but slightly congested, and the blood all over the body is black and uncoagulated. In every case the poison was easily discovered in the brain, the stomach, and the liver.

While, however, there seems to be a probable conversion of nitrobenzole into aniline in the living animal body by a process of reduction, there is also undoubtedly a change of an opposite character going on upon the surface of the body, whereby the salts of aniline are oxidized and converted into *mauve* or *magenta* purple. Some remarkable facts illustrative of this have been brought under my own notice, and have been the subject of clinical observation.

In the month of June, 1861, a boy aged sixteen was brought into the London Hospital in a semi-comatose condition. He had been scrubbing out the inside of an aniline vat, and while so doing he breathed an atmosphere charged with the vapor of the alkali, and became insensible. He did not suffer pain or

discomfort, but was suddenly seized with giddiness and insensibility. When he was brought to the hospital he looked like a person in the last stage of intoxication: the face and surface of the body were cold, the pulse was slow and almost imperceptible, the action of the heart was feeble, and the breathing was heavy and laborious. After rallying a little, he complained of pain in his head and giddiness. It was then noticed that the face had a purple hue, and that the lips and lining membrane of the mouth and the nails had the same purple tint. The next day, although the narcotic effects of the poison had passed away, he was still remarkably blue, like a patient in the last stage of cholera.

In the early part of last year, sulphate of aniline was given in rather large doses to patients in the London Hospital affected with chorea. The doses ranged from a quarter of a grain to seven grains. They were frequently administered, so that large quantities of the salt were taken in a very short time. In one case as much as 406 grains were taken in the course of a few days. No very remarkable effects followed beyond this, but after a few doses had been taken, and the system had become, as it were, saturated with the salt, the face became of a leaden-blue color, the lips and gums looked as if the patients had been eating black currants, and the nails also acquired a purple hue. The color faded a little before the time came for the administration of another dose, but soon after taking it appeared again; and this was the subject of constant observation. Dr. Fraser and Dr. Davies have recorded the results of their experience in five cases,* from which it would seem that although the free alkali is a powerful poison, the sulphate of it has but little action upon the animal body.

The general conclusions which appear to me to be warranted by these investigations are:—

1st. That nitrobenzole and aniline in its free state are powerful narcotic poisons.

2d. That they exert but little action, as local irritants, on the stomach and bowels.

3d. That although the effects may be quick, and the fatal

* "Medical Times and Gazette," March 8, 1862, p. 339.

termination of them rapid, yet nitrobenzole may remain in the system a long time without manifesting its action.

4th. That the salts of aniline are not nearly so poisonous as the free alkali.

5th. That in rapid cases of fatal poisoning, both the poisons are readily discovered in the dead body.

6th. That in slow cases the poisons may be entirely changed or eliminated, and therefore not recognizable.

7th. That both of the poisons appear to be changed in the body by processes of oxidation and reduction, nitrobenzole being changed into aniline, and aniline and its salts into mauve or magenta.

In an appendix* are given notes of the two cases of fatal poisoning by nitrobenzole referred to in the paper, and a detailed account of twelve experiments on animals with nitrobenzole, and three with aniline; also the process employed for the recognition of aniline and nitrobenzole in the dead body, as follows:—

1st. The matters to be analysed were bruised in a mortar with a little water, and very slightly acidulated with dilute sulphuric acid.

2d. They were then submitted to distillation in a glass retort, —the distilled products being saved in three or four separate portions by changing the receiver at different stages of the process. In this way the presence of nitrobenzole was discovered.

3d. The residue in the retort, when reduced to a pulpy mass by the distillation, was treated with strong spirit of wine and filtered.

4th. The filtered alcohol solution which contained the aniline was treated with a slight excess of subacetate of lead, and again filtered. In this way gum, dextrine, etc., were removed.

5th. The filtered solution was treated with a slight excess of a saturated solution of sulphate of soda in water. In this manner the excess of lead was precipitated as a sulphate.

6th. The clear solution was then made very alkaline with caustic potash, and distilled to dryness from an oil-bath. The

* Preserved in the Archives.

aniline, together with ammonia from the animal matters, was found in the clear, colorless, distilled spirit.

7th. This was neutralized, or rather made acid, with a slight excess of dilute sulphuric acid, and evaporated nearly to dryness in a white porcelain dish. If necessary, the spirit was saved by distillation.

8th. The residue was of a pinkish color if aniline was present, and occasionally there were little streaks of blue around the edges of the white porcelain dish. If the quantity of the saline residue was not more than a grain or so, it was at once tested by dissolving it in a few drops, or even in a single drop, of dilute sulphuric acid (1 to 1). A small portion of it was then placed upon a strip of bright platinum; and the platinum having been connected with the positive pole of a single cell of a Grove's battery, the liquid was touched with the negative pole: in a few seconds, if aniline was present, the liquid would acquire a bronze, a blue, or a pink color; the kind of color being dependent on the amount of aniline present,—bronze being the result of much aniline, and pink of a very little. In this way at least $\frac{1}{2000}$ th part of a grain of aniline was easily recognized.

To another portion of the acid liquid placed upon a white porcelain plate, a little peroxide of lead or red prussiate of potash was added, and a blue or purple reaction followed. This test is not so delicate as the last, for it fails when the amount of aniline is less than the $\frac{1}{1000}$ th of a grain.

Other tests may be resorted to if necessary, as when the quantity of aniline is large. Thus peroxide of manganese or bichromate of potash may be used in the same way as the red prussiate of potash in the last experiment; but these tests will not answer with less than the $\frac{1}{500}$ th of a grain of aniline. Lastly a drop of a solution of chloride of lime may be added to the acid liquid, and if the quantity of aniline exceeds the $\frac{1}{100}$ th part of a grain it will cause a purple reaction.

9th. If the quantity of saline residue from the last operation is large, and there is reason to believe that much ammonia is present, this alkali must be got rid of, for it greatly interferes with the success of the color-experiments. The residue, therefore, is made moist with water, and rubbed down with about

twice its bulk of neutral carbonate of soda. It is then exposed to the air for a short time until the odor of ammonia has passed away. It is then treated with strong alcohol, filtered, acidulated with dilute sulphuric acid, and again evaporated. The aniline is now fit for the color-experiments.

There are no fallacies to these experiments; for although, as I have elsewhere shown, strychnia will give nearly the same color-reactions, yet in the first place this alkali is not volatile like aniline, and will not therefore distil over as the latter does; and in the next place, while the best effects, in respect of color, are developed with dilute acid and aniline, strychnia requires the concentrated acid. These differences are sufficient to prevent any embarrassment as regards the two alkaloids.—*Lond. Pharm. Journ.*, September, 1863.

METHODS OF TESTING THE PURITY OF ALCOHOLS AND ETHERS.

It is well known that compound ethers are always liable to contain small quantities of water and of alcohol, even when they have been carefully rectified and dried. Alcohols also frequently contain traces of compound ethers. These impurities are difficult to separate, and often not easily detected. M. Berthelot gives the following elegant and efficient means for their recognition:—

“1. I take as a starting-point the fact that a compound ether, if pure, is decomposable by an alkali, by saturating an equivalent weight of this alkali. By this means, as I showed about ten years ago, the analysis of ethers and analogous compounds is founded on an alkalimetric test, based on the use of a standard solution of baryta.

“2. By means of the same liquid the smallest quantities of compound ethers may be recognized and estimated in alcohol or in simple ethers, provided these bodies are not alterable by alkalis. Ten cubic centimetres of a standard solution of baryta, and a well-known weight of the body to be tested, are enclosed in a flask. It is then heated for about a hundred hours at 100° ; if the alcohol is pure, as is oftenest the case with ordinary alcohol, the standard of the baryta does not change.

Amylic alcohol, on the contrary, almost always contains a small quantity of compound ethers, as also does ordinary ether, even after digestion on milk of lime.

"Glycol prepared by the ordinary methods, and rectified to a certain point, is particularly impure. I have found in it as much as 22 per cent. of combined acetic acid, corresponding to 40 per cent. of monoacetic glycol. This fact may occasion more than one error, and the knowledge of it will be useful to chemists occupied with this curious substance.

"To recognize the presence, without estimating, of a neutral ether in an alcohol, I heat the alcohol with twice its volume of water, for twenty hours, at 150°. Most of the neutral ether changes into acid.

"3. The presence of a free acid in an alcohol or an ether is so easily recognized that I need not stop to describe the process. Formic ethers, for instance, are always acid; but they decompose so promptly as to prevent the exact estimation of the free acid. The free acid of other ethers, on the contrary, can be precisely estimated.

"4. The presence of a small quantity of water in a neutral ether may be detected by heating this ether to 150° during twenty or thirty hours; the water decomposes an almost equivalent quantity of ether into acid and alcohol. The acid is then estimated by a standard solution of baryta. On submitting acetic ether carefully purified by the ordinary methods to this test, it will obstinately retain one per cent. of water, which is with great difficulty eliminated.

"5. The presence of a small quantity of water in alcohol may also be detected by mixing the alcohol with a perfectly anhydrous compound ether, tested as above. It is then heated for twenty or thirty hours at about 150°. If the alcohol is anhydrous, the mixture should not become acid.

"6. The presence of a small quantity of alcohol in a neutral and anhydrous ether, acetic ether for instance, may be detected by heating the ether with a known weight of quite pure acetic acid. The standard of the acid will diminish according to the amount of alcohol."—*Lond. Pharm. Jour.*, September, 1863.

HOP BITTER IN THE CRYSTALLINE FORM.

By Dr. J. C. LERMER.*

No substitute has ever been found for hops in the manufacture of beer; in fact, this plant seems to possess certain principles which render it peculiarly adapted for brewing. Besides the tannin, whose corrective influence on the injurious excess of protein compounds is well known, the strobules of hops contain other less known principles, which have also a most important influence on the qualities of beer. Ives was the first to direct our attention to a bitter principle contained in the yellow pollen of hops, and called this pollen lupulin (*Annals of Philosophy*, New Series, Vol. i., p. 199). Lupulin is naturally no definite chemical substance, but an organized compound of ethereal oil, resin, wax, &c.

I have, however, succeeded in separating the bitter principle in a pure and distinct crystalline form in the following manner:

15 lbs. of fresh hops are exhausted with 60 lbs. of ether. The ethereal solution is filtered and reduced to a syrupy consistence, and the residue allowed to stand for forty-eight hours, when a large amount of palmitic myricyle crystallized out. This being insoluble in alcohol of 90 per cent. may easily be separated from the bitter mother liquor. The alcoholic solution is again reduced to an extract, redissolved in ether, and the ethereal solution shaken with "strong solution of soda or potash till the alkaline liquor remains nearly colorless." In this way most of the resinous matter is removed. R. Wagener considers the bitter principle to consist of quercitron. If this were correct we should find it in the alkaline washings, but these contain principally resinous matter, and an appreciable amount of the new bitter principle.

I am investigating this alkaline liquor still further to ascertain its composition. The supernatant ethereal solution, which contains the principle amount of the bitter, has also in its turn absorbed a considerable quantity of alkaline solution, so as to have a strong alkaline reaction and dark-brown color. It is

* Condensed from *Dingler's Polytech. Journ.*, July, 1863, p. 54.

shaken with pure water, which removes the alkali and bitter principle, leaving only impurities in the supernatant ethereal stratum.

The watery solution is mixed with a neutral solution of sulphate of copper, when a copious blue precipitate is produced, consisting of one bitter principle and oxide of copper. This precipitate is well washed and drained, and consists of fine blue crystalline needles, perfectly soluble in excess of ether, a circumstance which proves it to be a distinct combination of hop bitter and oxide of copper. The hop bitter has, in fact, acid properties; it, combined with the alkali, allowed water to remove the potash or soda salt from the ethereal solution, and the latter in contact with sulphate of copper gave rise to a double decomposition, forming sulphate of potash or soda and a copper precipitate. The well-washed precipitate is redissolved in ether, a current of sulphuretted hydrogen passed through the solution, the filtered ethereal liquor evaporated to a syrupy consistence in an atmosphere of carbonic acid, and allowed to stand for twenty-four hours, when it will set into a compact crystalline mass, from which the still adhering impure mother liquor may be removed by washing with nitrobenzole, and the remaining crystals drained on plates of gypsum.

The pure white crystals when exposed become soon colored, moist, and glutinous, resembling in this respect the yellow pollen of hops itself. They are brittle, brilliant rhomboidal prisms, insoluble in water, soluble in alcohol, ether, chloroform, sulphide of carbon, benzol, oil of turpentine, &c., their solution has a pure bitter taste, and acid reaction.

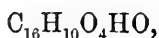
The composition of the copper salt corresponds to the following formula :



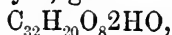
which corresponds to the following centesimal proportions :

			The values actually found were,—	
			1st experiment.	2nd experiment
CuO	=	39.7 = 12.70	12. 5	12. 9
C ³²	=	192.0 = 61.40	61.42	60.96
H ²⁵	=	25.0 = 7.99	7.48	7.10
O ⁷	=	56.0 = 17.91		
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312.7 = 100.00				

The hop bitter, or bitter acid, has some analogy with other bitter principles of plants. According to Lucks, absinthiin has the formula,



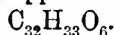
which, when multiplied by 2, gives—



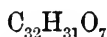
or



and according to Mayer, jalappinolic acid is—



and jalappinol—



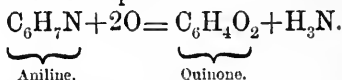
Besides the above bitter acids hops contain two other crystalline principles, which Dr. Lermer is still investigating, and he adds that hops, like opium and cinchona bark, contain various crystalline principles.—*Chem. News, Lond., Aug. 29, 1863.*

ON QUINONE.

By PROFESSOR A. W. HOFFMAN.

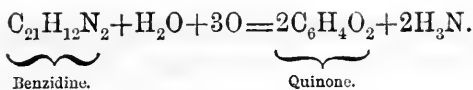
The easy and perfect transformation of betaphenylenedia. mine into quinone, which process I have described in a previous paper (*Comptes-Rendus*, vol. lvi. p. 995), has led me to study the action of oxidising agents on some other derivatives of the phenic series.

Aniline, submitted to the action of a mixture of peroxide of manganese and weak sulphuric acid, gives appreciable quantities of quinone, which sublimes, while the residuum contains manganic and ammoniac sulphates.



But this equation represents but one phase of the reaction; the greater part of the aniline undergoes greater alteration.

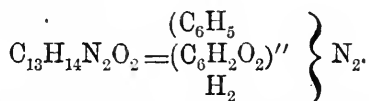
The experiment succeeds much better by treating benzidine in the same way. Submitted to the action of heat, the mixture instantaneously disengages torrents of quinine, which condenses in beautiful needles in the receiver. Benzidine seems to change molecularly into quinone.



While preparing quinone by the oxidation of aniline the idea naturally occurred to me to study the reciprocal reaction between these two bodies.

The brownish-red liquid obtained by dissolving quinone in aniline is soon converted into a mass; the crystalline product of the reaction being insoluble in water, alcohol, and ether, it cannot be purified by crystallisation; the quinone and aniline should be made react in presence of a large quantity of boiling alcohol. The brown solution on cooling deposits in brownish-red flakes of almost metallic lustre, which, by simple washing in alcohol, are obtained perfectly pure.

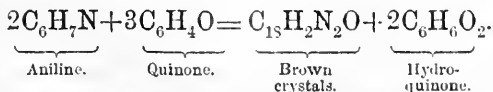
Submitted to analysis, the new substance has given figures according with the formula—



The complementary product of the reaction is easily eliminated from the mother water of the brown crystals. The saline residuum obtained by adding hydrochloric acid, and evaporating to dryness, is a mixture of hydrochlorate of aniline and hydroquinone, which are easily separable by ether.

The hydroquinone dissolves while the salt of aniline remains insoluble. By evaporating the ethereal solution, I obtained colorless needles of hydroquinone, with all the prominent characteristics distinguishing this remarkable body. The aqueous solution treated by ferric chloride immediately deposited green crystals with a gold reflection of intermediary hydroquinone.

The action of quinone on aniline is then represented by the following equation:

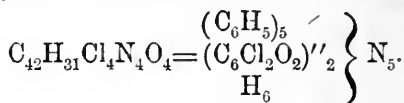


The observations already recorded induced me to repeat the experiment described by M. Hesse (*Annalen Chemie und Pharmacie*, vol. cxiv. p. 307), in his excellent work on the quinone series.

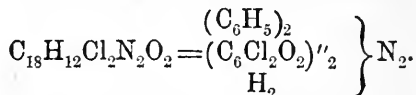
By making chloranile (tetrachlorated quinone) react on aniline, M. Hesse obtained a body crystallised in brownish-red

flakes, resembling in its general properties the quinone derivative above described.

The composition of the substance obtained by chloranile, M. Hesse expresses by the formula—



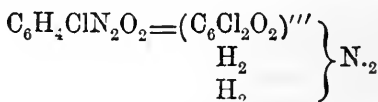
My analyses do not confirm this bold formula. The substance I prepared, whose properties are identical with those described by M. Hesse, contains less carbon, and is represented by—



This is the formula of the quinone derivative with two atoms of hydrogen replaced by chlorine. The action of chloranile on aniline is partly analogous to that of quinone.



The formula I have proposed is further supported by the reciprocal action of chloranile and ammonia, which causes the formation of the chloranilamide discovered by Laurent (*Comptes-Rendus*, vol. xix., p. 323), and expressed by the formula—



I am convinced that toluidine produces compounds analogous to both quinone and chloranile. The presence of toluidine in the aniline which served for M. Hesse's experiments will probably explain the greater amount of carbon found by this chemist.—*Chem. News, Lond., Aug. 8, 1863.*—*Comptes-Rendus*, June, 1863.

MYSICHT'S ELIXIR OF VITRIOL.

"Nobilius et efficacious stomachicum in totâ republicâ medicâ nondum inventum esse, experientiam ipsam attestor."—Hadrian à Mysicht, *Thesaurus et Armamentarium medico-chymicum*.

The statement of Mr. Johnson in the last number of the *Pharmaceutical Journal* (page 70,) that the *Elixir of Vitriol*

of *Mynsicht* is identical with the *Acidum sulphuricum aromaticum* of the Edinburgh and Dublin Pharmacopœias, is not quite correct, though it is true that the latter medicine is a simplified form of Mynsicht's preparation, which it is doubtless intended to represent. In the London Pharmacopœia of 1721, the following is the formula for

Elixir Vitrioli Mynsichtii.

R Cinnamomi,
Zinziberis,
Caryophyllorum, ana ʒiij.
Calami Aromatici ʒi.
Galangæ minoris ʒiss.
Foliorum Salvix,
Menthæ crispæ, ana ʒss.
Cubebarum,
Nucis Moschatæ, ana ʒij.
Ligni Aloës,
Corticis Citri, ana ʒi.

Fiat pulvis. Adde

Sacchari Candi ʒiij.
Spiritus Vini lb.iss.
Olei Vitrioli lb.j.

Extrahe tincturam digerendo dies viginti s.a. deinde filtra ad usum.

In the succeeding Pharmacopœia, that of 1746, this preparation is replaced by the following:

Elixir Vitrioli acidum.

R Tincturæ aromaticæ M. lb.j.
Spiritus vitrioli fortis, olei dicti, P. ʒiv.

Misce gradatim, et postquam fæces subsederint per chartam cola.

In the Pharmacopœia of 1788, Elixir of Vitriol is omitted, the College ordering in its place, *Acidum vitriolicum dilutum*, which, under the modernized name of *Acidum sulphuricum dilutum*, has been continued in all subsequent editions.

As the mixing of sulphuric acid with alcohol gives rise to the formation of sulphovinic acid, it is obvious that these elixirs may differ in chemical composition from *Dilute Sulphuric Acid*.—D. H.

Lond. Pharm. Journ., Sept., 1863.

NEW PROCESS FOR THE COMMERCIAL MANUFACTURE OF ANILINE.

By H. VOLH.*

The author recommends the following, which he states he has experimented with on a large scale :

A concentrated solution of hydrate of potassium or sodium and of glucose are introduced, together with the nitrobenzole, into a distilling apparatus. In the course of a few moments the mixture becomes heated, and vapors of aniline and nitrobenzole are given off. As soon as the action has moderated a little, a current of steam is passed through the mixture, which carries away all the aniline formed. The condensed products are returned to the still, and rectified by a second distillation by means of a jet of steam. To avoid loss, the aniline which is dissolved in the condensed water is separated by the addition of a little common salt or sulphate of soda. It is not necessary to make use of superheated steam, the temperature of the vapor at a pressure of an atmosphere and a-half being more than sufficient. The author has tried the use of cane sugar in place of glucose ; the reduction takes place just the same, but the yield of aniline is smaller.—*Chem. News, Lond., Aug. 8, 1863.*

PREPARATION OF CHLORIDE OF LIME.

By C. SCHRADER.†

The author gives the following as the conditions under which a good chloride is obtained, which will keep its strength for a long time :

1. The lime employed must be free from iron and alumina. The hydrate may contain from 6 to 12 per cent. of moisture without any injury to the result.

2. The chlorine must be passed slowly to the hydrate of lime. If this precaution is neglected, the absorption may be so rapid as to produce an elevation of temperature, and cause the formation of some chlorate of lime.

3. When the hydrate is supersaturated with chlorine, the

* *Polytechnisches Centralblatt*, 1863, p. 624.

† *Polytechnisches Centralblatt*, 1863, p. 156.

chloride obtained quickly decomposes, consequently it is necessary to employ the hydrate and hydrochloric acid in proper proportions determined by practice. These proportions will necessarily vary with the strength of the hydrochloric acid and the purity of the manganese.

4. In proportion to the absorption of chlorine the affinity of the hydrate of lime for chlorine diminishes; so at the close of the operation the apparatus must contain free chlorine in a gaseous state, or the finished chloride will have an excess of hydrate of lime.

5. By attending to these points a product may be obtained, which will contain from 33 to 35 per cent. of bleaching chlorine, and which will lose only 3 or 4 per cent. of its strength in the course of a year.—*Chem. News, Lond., Aug. 8, 1863.*

AN IMPROVED PROCESS FOR THE PREPARATION OF CHROME YELLOW AND RED.

By J. FRAUZOY. *

The author takes one hundred pounds of litharge, places it in a sufficiently large trough, and adds ten pounds of common salt, and enough warm water to make the whole into a thin paste. In the course of twenty-four hours the mixture swells up, and should then be well stirred. If it has become very thick, more water is added, until it reaches its original consistence. This is repeated as often as necessary, until the whole paste is decomposed, and chloride of lead formed, which generally happens in four or five days with the temperature at 68° or 70° F. Twelve pounds of nitric acid are now added; the mixture is again well stirred, and then left at rest for some hours. Fifteen pounds of alum dissolved in sufficient water to make a saturated solution are then added, and the mixture is once more well stirred. The chloride of lead is now changed into sulphate of lead oxide. After some hours the sulphate of lead, without pouring away the mother liquor, is added, stirring continually, to a solution of bichromate of potash. The latter must not be very strong, but should contain a pound of the bichromate in fifteen pounds of water.

* *Dingler's Polytech. Jour., July, 1863, p. 156.*

If a bright yellow shade is desired, the chromate of potash solution is to be added to the sulphate of lead quite cold, and in a small stream, the mixture being incessantly stirred. In this way a beautiful light chrome yellow is obtained. In the first process the solution of bichromate is made use of warm. In preparing an orange color the author uses carbonate of soda in place of alum. To make chrome red he adds a concentrated solution of bichromate of potash directly to the chloride of lead without forming either sulphate or carbonate. The mixture is well stirred, and in twenty-four hours a most beautiful chrome red is obtained.

Lastly, the colors are washed, the washings decanted, the last water is removed by pressure, and the color is made up and dried.—*Chem. News, Lond. Aug., 8, 1863.*

ELECTRIC ILLUMINATION AT BOSTON,—PHOTOMETRICAL POWERS OF THE LIGHT.

(In a letter to Prof. B. SILLIMAN, Jr., from Prof. WILLIAM B. ROGERS, dated Boston, August 14, 1863.)

I send you a short account of my observations on the power of the electric light exhibited with such striking effect by Mr. Ritchie, on the evening of the 6th inst. (the National 'Thanksgiving') in this city. Through his kindness, I was enabled to make a more satisfactory measurement of the illuminating force of the battery at the State House, than I had the means of doing on the occasion of its former exhibition on the 4th of July.

The battery in question, consisting of 250 Bunsen elements, having each an acting zinc surface of about 85 inches, and grouped in five battalions of 50 each, was arranged in the dome of the State House, and the carbon light and the photometric apparatus prepared for the purpose were placed in line across the same apartment, commanding a range of about fifty feet.

In view of the immense power of the light as observed in the previous experiment, I substituted for the 20-candle gas burner, used at that time as the standard of comparison, a unit ten times as great, formed by the flame of a kerosene lamp placed in the focus of a small parabolic reflector and throwing its con-

centrated light on a photometric screen of prepared paper fixed in front of it, at the distance of five feet. Before the observation, the lamp and reflector were so adjusted as to make the light cast on the near side of the screen equivalent by measure to the action of 200 candles.

This was done by the intervention of a kerosene lamp fitted up with a bridge of platinum wire for defining and restricting the height of the square flame. Such a lamp I find of frequent use in ordinary photometry, as, when suitably adjusted, it gives the light of about eight standard candles, and thus transfers the measurement in the photometer to the wider divisions of the scale. Being suspended in a balance of peculiar construction, its rate of consumption enables us to correct for any slight departure from the assigned illumination. The lamp thus regulated was placed with its flat flame 12 inches from the screen, while the lamp in the reflector was distant 60 inches—and the flame of the latter was adjusted until the effects on the screen were equalized.

A platform supporting the standard lamp and screen at the assigned distance was arranged to slide on a horizontal graduated bar, extending directly towards the carbon points, so that the screen should receive the rays from the electric light and from the reflector perpendicularly, on its opposite faces. In making the observations, the platform was moved to and fro until the illumination on the opposite sides of the screen was judged to be equal, and then the measured distance of the two antagonizing lights from the screen gave by easy computation their relative illuminating power.

By a series of such observations, it was found that the carbon light had a force varying from 52 to 61 times that of the lamp with reflector, making it equivalent in illuminating power to the action of from 10,000 to 12,000 standard sperm candles pouring their light from the same distance upon the surface of the screen. This it will be remembered is the effect of the unaided carbon-light sending its rays equally in all directions from the luminous centre, and falls vastly short of the illuminating force of the cone of collected rays which was seen stretching like the tail of a comet from the surface of the great reflector. Judging from some recent experiments on the power of such a reflector

to augment the intensity of the light emanating from its focus, there can be no doubt that, along the axes of the cone when brought to its narrowest limits, the illuminating force of the carbon light as displayed on the State House could be rivalled only by that of several millions of candles shining unitedly along the same line.

In the above described observations, a thick screen was necessary on account of the great intensity of the lights to be antagonized. I need hardly say that the different color of the two lights added much to the difficulty of the measurements. But, by making in each case the extreme limits on either side, it was practicable to adjust the screen pretty accurately to equality of illumination.

The only previous experiment of precisely the same kind which I can recall is that of Bunsen, cited in the books, which was made with a battery of 48 elements. In this the photometric equivalent of the carbon light was estimated at 572 candles, or near 12 candles to the cell. My observations show a power more than three times as great, or about 40 candles to the cell, a difference due no doubt largely to the more intensive battery at my disposal and the cumulative effect of its arrangement. I suspect, too, that the elements in Bunsen's observation were of inferior size, but on this point I am without definite information.—*Am. Jour. Sci. and Arts*, Sept. 1863.

DETECTION OF NITRIC ACID IN WATERS BY MEANS OF BRUCIA.

Kersten (*Ann. Ch. u. Ph.*, cxxv. 224) finds that $\frac{1}{100}$ of a milligramme of nitric acid in a cubic centimetre of water may be plainly detected with help of brucia. The reagents must be specially purified before they can be employed. The water is repeatedly rectified over potash. The brucia is washed with pure water several times to remove nitrates. English sulphuric acid is mixed with 5 per cent. of carbonate of ammonia and $\frac{3}{4}$ distilled off in a glass vessel.*

* According to Goppelsröder (*Verhandl. der naturforsch. Gessells. in Basel*. 1861, 159) *fuming oil-of-vitriol* is free from oxyds of nitrogen. This observation has been confirmed in the Sheffield Laboratory.—[S. W. J.]

Kersten dissolves the brucia in 1000 times its weight of water, pours 1 c. c. of this solution into a champagne glass, adds 1 c. c. of the water to be tested, and finally 1 c. c. of sulphuric acid. The latter is allowed to flow down the side of the glass so as to gather beneath the water. At the plane of contact to the two liquids a rose-red zone immediately forms if the nitric acid be present in detectable quantity.—*Am. Jour. Sci. and Arts, Sept., 1863.*

S. W. J.

SOME ACCOUNT OF PAULLINIA SORBILIS AND ITS PRODUCTS.

By T. C. ARCHER, ESQ.

The author remarked :—There is no more remarkable plant in the Order Sapindaceæ, if regarded from an economic point of view, than *Paullinia sorbilis*, although, as a plant, it is not well known to the botanical world. From its large seeds is manufactured the substance called “Guarana,” which is extensively used in Brazil, Guatemala, Costa-Rica, and other parts of South America, as a nervous stimulant and restorative. The seeds deprived of their coverings are pounded into a paste, which, hardened in the sun, constitutes Guarana. It is used both as a remedy for various diseases, and also as a material for making a most refreshing beverage ; and it adds another of those incidents so puzzling in human history of the discovery of such qualities in plants least likely to be suspected : such, for instance, as that the leaves of Tea, the seeds of Coffee and Cacao, the leaves and twigs of the various American Ilexes, and other plants should have this wonderful restorative effect on the nervous system, and that this should not be a mere vague notion. such as attaches to thousands of other plants, but that it should really depend upon the presence of a chemical principle, the same in all, and the operation of which can be satisfactorily explained. The presence of an alkaloid, which he called Guaranine, was discovered some years ago in Guarana, by Dr. Theodore von Martius, of Erlangen, but its identity with Theine was soon established, and subsequent analyses, especially one by Dr. Stenhouse in 1856, proved that not only was the active principle of Guarana identical with Theine, but that as far as is

known, no other substance yields it so abundantly, the amount being 5.07 per cent. as against good black tea, which yields 2.13, and coffee from 0.8 to 1.00. The mode of using the Guarana is curious and interesting. It is carried in the pocket of almost every traveller, and with it the palate bone or a scale of the large fish (*Sudis gigas*), locally called "pirarucu," the rough surfaces of which form a rasp upon which the Guarana is grated, and a few grains of the powder so formed are added to water, and drunk as a substitute for tea. The effect is very agreeable, but as there is a large portion of tannic acid also present, it is not a good thing for weak digestions. Its remarkably restorative power has given it a further great reputation as an aphrodisiac. Another species of this genus, *Paullinia Cupana*, also enters into the composition of a favorite national diet-drink. Its seeds are mingled with cassava and water, and allowed to pass into a state of fermentation, bordering on the putrefactive, in which state it is the favorite drink of the Orinoco Indians.—*Lond. Pharm. Jour. Sept. 1863, from Proceedings of the Botanical Society of Edinburgh, in Gardeners' Chronicle.*

ON PHENIC ACID—ITS ACTION ON VEGETABLES, ANIMALS, FERMENTS, POISONS, VIRUS, MIASMAS, AND ITS APPLICATIONS TO HYGIENE, TO THERAPEUTICS, AND TO THE ANATOMICAL AND INDUSTRIAL SCIENCE.

By M. LE DOCTEUR JULES LENAIRE.*

As the subject treated of in these papers is of considerable practical importance, we shall present our readers with a short abstract of them.

Phenic acid ($C_{12}H_6O, HO$) was discovered in 1834 by Runge, who has given it the name of carbolic acid. Laurent, who studied this body, and described many of its combinations, designates it under the name of phenic and hydrate of phenyle, because he objects to place it among the acids. Gerhardt gave it the name of phenol. It has also received the names of phenic alcohol, of spyrol, and of salicone. [In this country the acid is best known in trade as carbolic acid.]

It has been formed synthetically by M. Berthelot by passing

* Le Moniteur Scientifique, vol. iv., p. 649, and *passim*.

alcoholic or acetic acid vapors through a porcelain tube heated to redness. The acid is also obtained in the dry distillation of a benzoin, quinic acid, the resin of zanthorrea hastilis, castoreum, and chromate of pelosine. Gerhardt has obtained it from salicylic acid by the action of lime or baryta. Stædeler has found that the urine of man, the horse, and the cow contain it in quantities easily perceivable. It exists also in commercial creosote; † but it is from the oil from gas tar, which contains it in considerable quantity, that it is obtained.

Preparation.—The oil from coal tar is submitted to fractional distillation. The part which passes over between 160° and 190° is treated with a hot saturated solution of caustic potash and some powdered potash. A mass of crystals is thus obtained, which may be separated by decantation of the fluid.

When this mass is dissolved in water the solution separates into two layers, one light and oily, the other heavy and watery. The latter is separated and treated with hydrochloric acid, which sets free the carbolic acid. To obtain it pure, it must be digested with fused chloride of calcium and re-distilled once or twice. After several rectifications, and by cooling slowly, it can be obtained in a solid colorless crystalline mass.

The pure acid has an odor resembling creosote; the specific gravity = 1.065. It burns with a reddish flame; boils between 187° and 188° C. It does not redden litmus, only making an oily stain on the paper. It is soluble to some extent in water, but is very soluble in alcohol, ether, and acetic acid, as well as in glycerin and the fixed and volatile oils.

The pure acid acts energetically on the skin. A weak aqueous solution coagulates albumen and the blood, and acts as a strong antiseptic. Putrid meat and fish, faecal matters, and fermented urine instantly lose their disgusting odor when immersed in or treated with the solution.

† The substance sold commercially under the name of creosote is often only phenic acid more or less pure; but the pure creosote, extracted from wood tar by Reichenbach, is a perfectly distinct body. It is to this latter creosote that wood vinegar, tar water, the soot and the smoke of wood owe their antiseptic properties. (Gerhardt, t. iii, p. 18.) According to M. Fairlie and M. Scrughain, this creosote would be a combination of phenic acid and hydrate of cresyle.

Chemically, phenic acid is a weak acid. It combines with metallic oxides, but the salts have little stability; carbonic acid decomposes them. Those with an alkaline base have always an alkaline reaction.

In consequence of the supposed little solubility of carbolic acid in water, it has hitherto been chiefly employed mixed with powders, as in the case of Smith and McDougall's disinfecting powder; but the author of these papers has by careful experiments determined that the pure acid is sufficiently soluble in water for the solution to possess the power of coagulating albumen, of arresting or preventing spontaneous fermentation, and consequently of destroying infection. The saturated solution acts also on plants and the lower animals as a violent poison, though containing but about five per cent. of the acid. The solubility of the acid may be considerably increased by the addition of from five to ten per cent. of alcohol or of acetic acid.

From the experiments which the author has made on the action of phenic acid on plants and animals, it appears that a very weak solution will instantly destroy the lowest forms of animal and vegetable life. The juices of vegetables are prevented from becoming mouldy by the addition of the smallest quantity of the acid. Herbs and shrubs watered with a stronger solution rapidly die.

The microscopic beings concerned in the production of putrefactive fermentations are as quickly destroyed by a weak solution, and the putrefaction is completely arrested. Parasitic and earth worms also are easily killed by a solution containing one half per cent., or by exposure to air containing but a small proportion of the acid. An injection of water containing one half per cent. of the acid brought away from a child a large quantity of *ascarides lumbricoides*, all dead. A stronger solution kills the eggs of ants and earwigs, and larvæ of butterflies, caterpillars, &c.

The author has studied the action of the acid on the mammalia with mice, guinea-pigs, dogs, and horses, as well as men.

Action on the Human Skin.—Immediately after the application of a thin coating of the pure acid, a sharp smarting is felt, which lasts about an hour. The epidermis becomes wrinkled, and in a short time the formation of a white body may be re-

marked wherever the acid has touched. This white coloration results from the action of the acid on albumen; it disappears by degrees, and is replaced by some congestion, which lasts about twenty days. This congestion presents all the characters of an intense inflammation, being attended with redness, heat, and swelling. If a small piece of the epidermis (which appears raised as in a blister) be stripped off no serum escapes. The epidermis becomes detached by degrees, and when the exfoliation is complete a brown spot remains, which testifies for a long time to the energetic action of the acid. After a number of experiments on his own arms, and the arms of his friends, M. Lemaire assures us that the smarting never lasts longer than an hour. The redness of the skin endures about twenty days, but the inflammation never extends beyond the part to which the acid has been applied.

Action on the Mucous Membrane.—The action of the pure acid on the mucous membrane is, of course, analogous to its action on the skin; acute smarting, shrivelling up of the epithelium, and a milky coloration being observed. The smarting does not last so long as on the skin, especially on such membranes as produce an abundant secretion; and the epithelium quickly returns to its normal condition.

Action on the Respiratory Organs.—From experiments on mice and horses, the author concludes that the higher animals may breathe the diluted vapor of the acid for a long time without discomfort or danger.

Mode of Action.—The general fact resulting from the author's experiments is that phenic acid acts on plants and lower animals as a violent poison.

When the action of the acid on a semi-transparent leaf is examined, it is easy to prove that it coagulates albumen, and that the parenchyma and epiderm are contracted. This explains how it is that microphytes and microzoons die so quickly in its presence. All animals with a naked skin, and those which live in the water, die sooner than those which live in the air and have a solid envelope. The difference appears to result from the power of absorption, which is much greater in the former than the latter.

When frogs are placed in a saturated solution (5 per cent.)

of the acid the skin shrivels and becomes milky from the coagulation of the albumen. The branchiæ of fishes also become white. This coagulation of albumen led the author to suppose that the death of the animals resulted from the coagulation of their blood. To verify this supposition, he examined, under the microscope, the action of the acid on the branchiæ of the larvæ of salamanders, in which the circulation of the blood is easily seen. He then observed that although the solution arrested the circulation instantaneously, it altered neither the form nor appearance of the blood-globules. All the change consisted in their immobility. When the blood is coagulated by mineral acids the form of the globules is changed. With carbolic acid nothing of the kind takes place. Besides this, a post-mortem examination of a dog and horse proved that the blood was not coagulated. Phenic acid, then, does not kill by producing coagulation of the blood! Its action on the blood-globules, however, leads M. Lemaire to think that these globules are living beings.

Insects exposed to a weak dose of the acid become asphyxiated, but they soon recover in pure air.

When a gramme or two dissolved in water are administered to a dog, the animal falls as if struck with lightning, but soon recovers again. The sudden fall the author ascribes to violent pain, and the rapidity with which it is absorbed and carried to the nervous centres.* It is on the nervous system, then, that phenic acid principally acts.—*Chem News*, Aug. 8, 1863.

(To be continued.)

NEW REACTION FOR VERATRIA.

Trapp, of St. Petersburg, has observed that the smallest traces of veratria dissolved in cold concentrated chlorhydric acid, giving a colorless solution, which, on continued boiling, assumes a red color that finally becomes very intense, and resembles that of permanganate of potash. This solution remains unaltered by standing for a long time.—*Am. Jour. Sci. and Arts*, from *Polytechnisches Notizblatt*, 1863, 96.

* Is not the action of the acid on the mucous surface rather against its rapid absorption?—ED. CHEM. NEWS.

GLUTEN IN CRUST OF BREAD.

M. Barral has presented to the Academy of Sciences some remarks of much interest concerning the crust of bread and the gluten contained in it. He had recently shown that, when equally dried, the crust of bread is more highly azotized than the crumb; and he also showed that the crust was more soluble than the crumb in water. M. Payen had, it is true, previously pointed out this greater solubility of the crust, and had ascribed it to the conversion of the starch into dextrine during the baking. But M. Barral's experiments show another important fact. "If," he says, "we exhaust with water an equal quantity of dry crust and dry crumb of bread, we find that the soluble portion of the crust consists of from seven to eight per cent. of nitrogen, whilst the soluble portion of the crumb contains only from two to three per cent. The greater solubility of the crust consequently, depends upon the transformation which its gluten has undergone under the direct action of the 200° to 220° heat of the oven. The soluble portion of the crust is more highly azotized than the juice of meat." M. Barral added that he was still engaged with his experiments, which would throw some new light on panification.—*Amer. Jour. Med. Sci.*, Oct. 1863.

VERMILLION ROCK SALT MINE AT PETITE ANSE,
LOUISIANA.

One of the facts of scientific interest brought to light by the Southern rebellion is the discovery of an important deposit of rock salt of remarkable purity in the island of Petite Anse, in Vermillion Bay, on the Gulf coast of Louisiana. By the kindness of Mr. Geo. D. Colburn, a large specimen of this salt has reached us. Its analysis by Dr. J. L. Riddell, of New Orleans, gives the following composition: Chloride of sodium 98.88, sulphate of lime 0.76, chloride of magnesium 0.23, chloride of calcium 0.13, = 100. This analysis, it will be seen, makes the Petite Anse salt almost pure.

Salt springs had been known on the island from an early period, but no suspicion existed of there being rock salt near the surface, until the late owner, Judge Avery, with the view to improve the flow of water from one of the saline springs, caused

an excavation to be made, when, at the moderate depth of only fourteen or fifteen feet from the surface, the laborers struck the bed of white rock salt, which they at first imagined must be ice. It was at once recognized, and proved of incalculable advantage to the Confederates, as well as a source of great wealth to the owner. The Island of Petite Anse (Little Elbow Island), so named from its shape, is a body of very fertile land, supporting rich crops of sugar cane and corn, besides forest trees, about $2\frac{1}{2}$ miles long by $1\frac{1}{2}$ wide and containing about 2100 acres. It rises 170 feet above tide in the midst of a wide spreading marine swamp. The soil of the island is an umber-colored argillaceous sandy loom, capable of forming good bricks.

The salt is covered by a whitish, cream-colored solid smooth rock, at an average depth of about $19\frac{1}{2}$ feet below the surface or $4\frac{1}{2}$ feet below tide water. There is no moisture or brine in the deposit, the salt being compact, hard and perfectly dry. Our intelligent correspondent is not a geologist, nor does he send us any fossils with the salt. But the deposit is undoubtedly of the Tertiary age.—*Am. Jour. Sci. and Arts*, Sept. 1863.

ON THE DISTILLATION OF MIXTURES: A CONTRIBUTION TO THE THEORY OF FRACTIONAL DISTILLATION.

By J. A. WANKLYN, Esq.

There are many points in the boiling of mixtures which are obscure. The tension of the vapors at the temperature whereat the mixture boils, and the proportions in which the constituents of the mixture are present, are not the only factors which determine the relative rates at which the constituents distil. There have, for instance, to be taken into account the adhesion of the liquids to one another, and the vapor-densities of these liquids. On the present occasion I have to call attention to the influence of this latter element, which influence seems to have been lost sight of by most of those who have applied themselves to this subject.

Leaving out of account for a moment the influence of adhesion, and simplifying the influence of the proportion in which the ingredients are present by taking equal weights of two liquids of different boiling-points, we may set down the rates at which these ingredients will distil as determined by the ten-

sions of the liquids and the densities of the vapors. In the first instant of time the quantity of each ingredient which distils will be found by multiplying its tension at the boiling-point of the mixture by its vapor-density. It thus appears that the liquid with the highest tension will not of necessity distil the quickest, for what the other liquids want in tension they may make up by the greater density of the vapors which they give off. And so when we mix a more volatile with a less volatile liquid and proceed to distil the mixture, we shall now and then find that the less volatile liquid distils faster than the more volatile one. I will here bring forward an experiment to illustrate this point.

	Vapor-density.
Methyl-alcohol boils at 66° C.	1.107
Iodide of ethyl boils at 72° C.	5.397

I took 18 grammes of methyl-alcohol and 17 grammes of iodide of ethyl, mixed them, and distilled off rather more than one-third of the mixture. The distillate consisted of

6.0 grammes methyl-alcohol,
8.7 grammes iodide of ethyl,

14.7

which shows in this case the less volatile constituent had boiled the faster, the less volatile iodide of ethyl having a very much higher vapor-density than methyl-alcohol.

It will be obvious that when the vapor densities and tensions are inversely proportional, the mixture must distil over unchanged. This influence of vapor-density goes a great way to explain why homologous bodies are so difficult of separation by means of fractional distillation. The more complex the formula, the higher the boiling-point, but also the higher the vapor-density, and therefore the greater the value of the vapor. Why oils, etc., distil so readily in steam is also explained; for aqueous vapor is one of the lightest, while oily vapors are generally heavy.—*Lond. Pharm. Jour. Sept. 1863.*

THE WAX-TREE OF JAPAN.

“ On this remarkable plant, the *Rhus succedanea* of botanists, the ‘Bulletin de la Société d’Acclimatation’ publishes an interest-

ing paper by M. Eugène Simon, now at Nagasaki. The vegetable wax of Japan is one of the chief articles which that country exports. It is not exactly of the same nature as common wax, since it melts in summer at the common temperature; but this inconvenience is obviated in Japan by protecting the candles made with this wax by a coating of beeswax. It appears that in England a process has been discovered for increasing its consistency, since the demand for the article from that quarter has considerably increased of late. The tree itself might be easily acclimatized in the southern parts of France. It thrives on mountains and on stony and barren ground, unfit for other agricultural purposes. M. Simon has sent over about twenty kilogrammes of its seed for trial. The young trees are planted in Japan along the highways, when they are two years old, leaving a distance of about three feet between the stems; but if planted in squares, the distance must be double. The trees are kept low by lopping, and trimmed in the shape of pyramids. In the fifth year after planting, each tree yields on an average 4lb. of seeds; in the eighth year, 6lb.; in the 10th, 18lb.; in the 12th, 40lb.; in the 15th, 60lb.; in the 18th year the tree enters upon its decline; 400lb. of seed yield 100lb. of wax. At present 200lb. of this wax are sold in London at the price of £5; so that a plantation of 10,000 trees in their prime may produce £4,000. The seed is gathered toward the end of autumn, threshed, and then left to dry for a fortnight, after which it is slightly roasted. It is next crushed under a mill-stone, and the produce exposed to the heat of steam in canvas bags; the wax is then obtained by the action of a screw press. This wax is of the third or lowest quality: to bleach it, it is rasped and rinsed in water, and then exposed to the action of the sun and dew for three days. A still higher quality is obtained by repeating this operation."—*Lond. Pharm. Jour. Sept. 1863*, from *The Times*.

COMBINATION OF PROTIODIDE OF IRON AND MANNA.

The protiodide of iron, in the form of pills, is very commonly employed in France, and the preparation generally contains the protiodide with a certain proportion of honey pow-

dered liquorice, and powdered mallow. M. Foucher recommends a kind of sugar-plum (*dragée*), composed of protiodide of iron, purified manna in tears, and powdered liquorice and mallow. By the union of these substances, M. Foucher obtains a mass in which the combination of manna with the protiodide preserves the latter from any alteration, and it forms a true paste, which, when divided into pills or *dragées*, soften, by the heat of the hand. Each *dragée* broken into pieces presents internally the greenish color characteristic of the well prepared and well-preserved potosalt of iron. In this preparation, therefore, there are two essential conditions observed—namely, the preservation of the salt without chemical alteration, and its easy solubility in the digestive passages. But M. Foucher also believes that the manna, by its laxative operation and its stimulating the secretions of the digestive canal, would also act both in facilitating the absorption of the drug and preventing the tendency to constipation which is one of the most troublesome effects of the ferruginous preparations.—*Lond. Pharm. Journ.*, Sept., 1863.

ABSORPTION OF GASES BY CHARCOAL.

DR. R. A. SMITH* has given the following as the results of his experiments on this subject:

Charcoal abstracts oxygen from atmospheric air at ordinary temperatures.

The absorption of oxygen continues for a long time, but the greater part takes place during the first part of the time the charcoal and air are in contact.

Hydrogen, nitrogen, or carbonic acid are not absorbed at the same time as oxygen, from gaseous mixtures.

The amount of gas absorbed by charcoal is in some degree proportionate to the condensibility of the gas; but this is not the only determining circumstance, in the case of oxygen at least.

The separation of oxygen that is absorbed by charcoal cannot be effected without production of carbonic acid, even at 212° F., and more slowly at lower temperatures.

* *Proceedings of the Royal Society*, xii. 424.

The absorptive power of charcoal differs for different kinds very much, so does the capability of combining with oxygen; animal charcoal excels wood charcoal, in this respect.

Nitrogen and hydrogen absorbed by charcoal, diffuse into an atmosphere of other gases with a force equal to a three-quarter inch column of mercury.

Water expels mercury from the pores of charcoal instantaneously.

Dr. Smith concludes from his observations:—

That the selective character of porous bodies may be closely related to—

1. The condensibility of gases;
2. Attraction, and perhaps tendency to combine;
3. Capacity of combination.

That in any case the attraction which determines the condensation of a gas is exercised at a distance greater than the distance of the atoms or molecules in combination.

That the gases in porous bodies lie in concentric strata, around the particles of the solid, which strata are unequally attracted according to their distance.

That chemical attraction cannot be distinguished from physical attraction, though attraction may exist without effecting its ultimate result of combination, and that the influence of mass upon chemical action may be due to this connection.

That there is no evidence of the existence of a specific attractive force determining chemical change, but only evidence of combination.

Mr. Hunter, of Queen's College, Belfast, has also published some results relating to this subject.† He has adopted the method employed by De Saussure. The charcoal was heated to redness before each experiment, and, while incandescent, plunged into the dry gas confined by mercury. The absorption generally terminated at the end of twenty-four hours. The results obtained were as follows, for a temperature of 0°C. , and pressure of 760 mm:—

† *Phil. Mag.*, xxv., 364.

TABLE II.

	Ammonia.		Carbonic acid.		Cyanogen.	
	Vol. absorbed reduced to 0° C. and 760 mm.		Vol. absorbed reduced to 0° C. and 760 mm.		Vol. absorbed reduced to 0° C. and 760 mm.	
	Experiment.	Mean.	Experiment.	Mean.	Experiment.	Mean.
Logwood.....	112.4 111.3 110.1	111.3	53.1 56.2	54.6	87.3	
Ebony.....	106.6 104.4 108.7	106.7	46.6 50.3 44.0	47.0	89.6	
Camwood	93.0 89.5	91.2	44.7 51.3 44.7	45.4		
Green Ebony.....	96.0 84.6	90.3	37.4 44.8 41.3	40.8		
Fustic (Cuba).....	89.7 89.1	89.6	61.7 54.9	58.0		
Lignum Vitæ.....	88.2 89.2 83.0	89.1	47.2 47.2	47.2		
Boxwood.....	86.6 84.5	85.6	31.2 31.2 30.2	31.2	28.8	
Jamaica logwood	65.0 73.8	69.5	33.3 33.3	33.3		
Sapan wood.....	69.9 69.8	69.9	32.2 32.2	32.2		
Beech.....	54.6 61.3	58.0				
Rosewood... ..	50.6	50.6				
Wistaria Sinensis...	44.03	44.03				
Vegetable ivory.....	...	...	47.5 58.6 50.3	50.5	57.3	

The absorption was found to be very rapid in cases where the quantity of gas absorbed is large. The differences in the amount of absorption, sometimes considerable, are considered to be in part due to differences in the pieces of charcoal. In order to ascertain the influence of long-continued heating on the absorptive power of charcoal, a piece of boxwood charcoal was kept at a strong red heat for more than an hour. Its absorption was then found to be 79, while in the ordinary way of heating it was 85. It would appear from these results that dif-

ferent kinds of charcoal differ in their absorptive power for different gases. Logwood charcoal absorbs most ammonia; fustic charcoal most carbonic acid; and ebony charcoal most cyanogen.—*Chem. News, London, May 23, 1863.*

ON INHALATION OF NITROGLYCERINE.

By JOHN M. MERRICK, JR.

Various experiments have been made by different observers* upon the action of nitroglycerine or glonoine upon the animal economy—the nitroglycerine, or its solution in alcohol, being administered by dropping it upon the tongue—the effects which have been noticed being generally acceleration of the pulse, headache and prostration, and in peculiarly susceptible persons, these symptoms greatly aggravated.

These experiments, though somewhat contradictory, are very interesting, both from a chemical and a toxicological point of view, but do not touch upon one matter, viz.: the effects of the inhalation of the vapor of glonoine—a subject to which considerable interest must attach itself when we consider the rapidity with which the symptoms develop themselves when only a fraction of a drop is placed on the tip of the tongue.

In preparing a quantity of nitroglycerine in 1859, I met with an accident, the result of which exhibits in a very marked and satisfactory manner the toxical properties of this curious substance, and shows the necessity for extreme caution in handling it, especially when mixed with a volatile and inflammable solvent, as alcohol or ether.

The nitroglycerine was prepared by allowing pure glycerine to drop from a pipette with a glass stop-cock, so adjusted as to allow from fifteen to twenty drops to fall in a minute into a mixture of equal volumes of the strongest nitric and sulphuric acids cooled by very cold water.

In repeated experiments I have found that, in spite of the precautions taken to cool the acids, it is impossible to avoid an accident now and then, since, when the action reaches a certain intensity, just as in the oxydation of uric acid or cotton, the ex-

* Vide Braithwaite's Retrospect of Practical Medicine, part xxxvii. p. 294.

periment ends in an explosion or a violent evolution of nitrous fumes. When such a result occurs in making glonoine, the bystander seldom escapes a severe headache, even though the experiment be conducted in the open air.

After glycerine equal to half the bulk of the mixed acids had dropped in, the whole was thrown into a large volume of cold water, thoroughly washed, drawn off with a pipette, dissolved in ether, and the ethereal solution evaporated on a water-bath. It was in this part of the preparation that the accident occurred which enables me to speak of the consequences which follow the inhalation of the vapor. The glass dish in which the evaporation was being conducted, by some mishap tipped over, spilling half its contents on the hot copper bath, and in a moment the room was full of the mixed vapor of nitroglycerine and ether. Although I stood directly over the water-bath to adjust it, and must have inhaled a large volume of the mixed vapor, no instant bad result followed, but in less than fifteen minutes a headache set in, slight at first, but increasing in intensity by degrees, until in an hour and a half it became almost intolerable. It was accompanied by a good deal of faintness and exhaustion, intolerance of light, and a feeling of great general distress and alarm, in addition to the racking pain. Relief was only obtained at length by the inhalation of a large quantity of ether, the insensibility produced by which was followed by broken and disturbed sleep lasting until the following day, which was marked by weakness, exhaustion, and slight headache. These unpleasant symptoms did not finally disappear for three or four days.

It may be remarked that, during all the time that the severe pain and distress lasted, consciousness was never lost for an instant. In Mr. Field's case,* *two drops* of a solution containing only one drop of glonoine to ninety-one of rectified spirit produced loss of consciousness and other very alarming symptoms of narcotic poisoning.

The effects of glonoine upon different individuals are exceedingly different and contradictory. Two drops of a diluted solution containing only one drop of nitroglycerine in ninety-nine of alcohol produces alarming symptoms of poisoning in one person,

* Vide Braithwaite ut supra.

while another swallows two hundred drops of a similar solution with no other ill effects than a slightly "muddled" feeling in the head. I have experienced unpleasant feelings from tasting exceedingly minute quantities of *pure* nitroglycerine, such as headache, buzzing in the ears, with a feeling of nervousness and depression, although the action of the drug does not seem to be nearly so powerful or so rapid as when it is given in the form of alcoholic solution. Pure nitroglycerine is volatile at ordinary temperatures—a fact which was accidentally discovered in drawing off with a mouth pipette some nitroglycerine which had just been washed with water. Headache and the usual symptoms immediately set in, though not a particle of the liquid touched my mouth or tongue.

The following experiment, which shows that some constitutions are susceptible to the action of one-fortieth of a drop of glonoine, was made with a solution of nitroglycerine containing two and one-half drops of the pure substance to ninety-seven and one-half of alcohol. The solution was dropped upon sugar, and the sugar allowed to dissolve on the tongue.

My general health being good, and my pulse being seventy-nine, about two and one-half hours after a full meal, I took *one* drop of the solution. In two minutes my pulse was ninety-four, with dull, throbbing headache; in five minutes the pulse was one hundred, the headache changing from the back to the front of the head; in ten minutes the pulse was down to eighty eight, and in fourteen minutes back to its normal rate, seventy nine, although the headache did not wholly pass off for fifteen minutes more. It will be noticed that a quantity of the solution was taken, equal to only one-fortieth of a drop of pure nitroglycerine.—*Am. Jour. Science and Arts*, Sept. 1863.

Walpole, Mass., July, 1863.

Abstract of the Minutes of the Philadelphia College of Pharmacy.

At a stated semi-annual meeting of the Philadelphia College of Pharmacy, held at their Hall, September 28th, 1863. Present 19 members.

The President in the Chair. In the absence of the Secretary from the city, William C. Bakes was appointed Secretary *pro tem*. The Minutes

of the last meeting were read and adopted, after which the Minutes of the Board of Trustees were read by A. B. Taylor, Secretary of the Board. The committee on the Internal Revenue Law not being prepared to make a report, an interchange of opinion took place with reference to that portion of the law going into effect on the 30th proximo. The Secretary of the Board of Trustees read a communication from E. B. Garrigues, asking the exemption of S. S. Garrigues from the payment of dues during his absence from the city. On motion it was referred back to the Board of Trustees with a negative recommendation.

On motion of Mr. Samuel F. Troth, Mr. John Horn and Mr. William Hodgson, Jr., were exempted from the further payment of their annual contributions, and retain their membership in the College.

A copy of the United States Coast Survey was presented to the College Library, by Mr. Thomas S. Weigand.

The Committee on the Herbarium made the following report, which was accepted and ordered to be entered on the Minutes:—"The Committee on the Herbarium report the reception of an interesting and extensive collection of several hundred plants, embracing also a number of European specimens, from Edmund A. Crenshaw of this city. The committee have paid attention to the preservation of the specimens, now composing the Herbarium, and have added to it, during the past season, a few plants collected in this immediate neighborhood. Signed,

GEORGE J. SCATTERGOOD,

W. R. WARNER,

THOS. P. JAMES."

It was, on motion, resolved that the Chairman of the Committee on Deceased Members, be requested to prepare a notice of the death of our late fellow member, Mr. Warder Morris, and insert it in the proceedings of this meeting, to be published in the Journal.

WARDER MORRIS was born October 3d, 1789, at Pottsgrove, Pa. He was placed in the store of John and Daniel Elliot, to qualify himself for business, and at twenty commenced on his own account at No. 45 N. Third st., where he continued to conduct the business of a Druggist and Pharmacist for forty-four years, retiring in 1853. As a business man his knowledge and experience were extensive, and his judgment good. His practice was distinguished by rigid economy and ready adaptation of means to ends.

From a pharmacist, who was formerly in his employ as an apprentice, we learn that he was seldom idle, nor ever permitted those about him to be so; he was a man of few amusements and few vices, but with many internal resources; he read much, and had a large stock of general information; conversed well, but not freely, using very few superfluous words, and much could always be learned from his conversations, particularly when his hearers knew him well enough to accommodate themselves to his peculiarities.

With earnest, active and energetic traits, he was not free from a rigid bluntness, which often shows itself in the manner and bearing of original characters, but his strict justice in dealing with others, and his dislike of

everything pretentious and showy, were marked characteristics, which won the esteem of those who came in contact with him.

Our late fellow member was one of the founders of the Philadelphia College of Pharmacy, being very zealous in the determination to establish on a permanent basis, an Institution that should do credit to our profession. He was a member from the organization of the College, in 1821, to the time of his death, a period of forty two years—thirty years of which time he was a faithful member of the Board of Trustees.

In 1844 the College became financially embarrassed, on account of money borrowed from its members to build a Hall, at which time he was the first to step forward with an offer to relinquish half of his loan, (which was considerable), to relieve the Institution from its difficulty, and also labored much to induce others to do the same, a movement by which the College was placed on an independent footing.

He died at his home, in Philadelphia, on the 10th of March, 1863, in the 74th year of his age.

The Corresponding Secretary read a communication from Mr. Charles Murray, Secretary of the Argentine Pharmaceutical Society of Buenos Ayres, accompanying a donation of several numbers of the *Revista Farmaceutica*, published in that city, which the Corresponding Secretary was requested to acknowledge, and return the thanks of the College.

The question as to whether an apprentice in an "Eclectic" establishment would be eligible to graduate in this College, was decided in the negative.

Recommendation No. 27, for Honorary Membership, was proposed, and in accordance with the By-laws, laid over for action at the next annual meeting.

The Delegates from this College to the meeting of the American Pharmaceutical Association, held in Baltimore, not having prepared a formal report, Mr. William Evans, Jr., of the delegation, was invited to give an account of the proceedings. He stated that the delegates from this College were all present but one—the proceedings were of an interesting character, and the meeting well attended by adjournment on five different occasions, till Thursday, the Association adjourned *sine die*, to meet in Cincinnati on the third Wednesday of September, 1864. The report of the Committee on the Progress of Pharmacy was elaborate and full. Some thirty or forty new members were received into the Association.

Messrs. Ellis and Procter related a number of interesting facts connected with the meeting, and spoke in warm terms of their appreciation of the kindness and hospitality of the Baltimore Pharmacentists.

The semi-annual election of Trustees, &c., was now ordered, Messrs. Charles Bullock, and John C. Savery acting as tellers, who reported the following as elected :

Trustees.

Wilson H. Pile,
Charles Bullock,
William J. Jenks,
William Evans, Jr.,

Evan T. Ellis,
Alfred B. Taylor,
George J. Scattergood,
William C. Bakes.

Committee on Deceased Members.

Edward Parrish, William Procter, Jr., Charles Bullock.

Committee on Herbarium.

George J. Scattergood, William Procter, Jr., Thos. P. James.

On motion the College adjourned.

WILLIAM C. BAKES, *Secretary pro tem.*

Editorial Department.

BRITISH PHARMACEUTICAL CONFERENCE.—In the July number of this Journal, a movement among English pharmacutists was alluded to. Since then we are glad to find that that movement resulted in the call of a convention of all interested in the progress of pharmacy, whether pharmaceutical chemists, chemists and druggists, or druggists, on the 2d of September, at which time the meeting was held at New Castle, upon Tyne.

The meeting convened at Baker's hotel, at 11 o'clock, A. M. Mr. Dean was called to the Chair, and Mr. Brady to act as Secretary.

Letters were then read from various pharmacutists expressing their sympathy with the movement, among whom we notice the names of Prof. Redwood, Prof. Bentley, and Daniel Hanbury, of London, and Mr. Mackay, of Edinburgh.

Mr. Deane then stated, at length, that the object of the meeting was "to establish an annual conference to be held in different parts of the country, for the purpose of affording a periodical opportunity of meeting our brethren in the provinces and discussing various subjects of the highest importance to us in our public and private relations." The speaker then showed in what particulars the pharmaceutical body at large needed reform; that ignorance was one of the greatest difficulties they had to contend with, and that the conference was a movement in favor of dispelling this ignorance and encouraging the spread of knowledge and a sound system of ethical rules of practice. He then pointed out the course to be pursued to bring the talent and ability of the body usefully to bear, and concluded by calling on Prof. Bentley to move the first resolution.

Prof. Bentley, after some preliminary remarks, then offered the following resolution:

"That it is desirable that an Association be formed, to be called the British Pharmaceutical Conference, for the purpose of holding in the provinces an annual meeting of those engaged in Pharmacy."

Dr. Atfield seconded the resolution which was then discussed, during which it was decided not to limit the membership to the Pharmaceutical Society, but to extend it to the other pharmaceutical classes. It was finally unanimously adopted.

A draft of a proposed constitution and by-laws was then introduced, discussed *seriatim*, and finally adopted as follows :

CONSTITUTION.

Art. I.—This Association shall be called the British Pharmaceutical Conference, and its object shall be the following :

1. To hold an annual Conference of those engaged in the practice, or interested in the advancement of Pharmacy, with the view of promoting their friendly reunion, and increasing their facilities for the cultivation of Pharmaceutical science.

2. To determine what questions in Pharmaceutical science require investigation, and when practicable, to allot them to individuals or committees to report thereon.

3. To maintain uncompromisingly the principle of purity in medicine.

4. To form a bond of union amongst the various associations established for the advancement of Pharmacy, by receiving from them delegates to the annual Conference.

Art. II.—Membership in the Conference shall not be considered as conferring any guarantee of professional competency.

RULES.

I. Any person desiring to become a member of the Conference shall be nominated in writing by two members and balloted for at a general meeting of the members, two thirds of the votes given being needful for his election. If the application be made during the recess, the Executive Committee may elect the member by a unanimous vote. Every member shall sign an obligation to conform to the rules of the Conference for the time being.

2. The subscription shall be 5s. annually, which shall be due in advance, upon July 1.

3. Any member whose subscription shall be more than two years in arrear, after written application, shall be liable to be removed from the list by the Executive Committee. Members may be expelled for improper conduct by a majority of three-fourths of those voting at a general meeting, providing that fourteen days' notice of such intention of expulsion has been sent by the secretary to each member of the Conference.

4. Every association established for the advancement of Pharmacy shall, during its recognition by the Conference, be entitled to send delegates to the annual meeting.

5. The officers of the Conference shall be a President, four Vice-Presidents, a Treasurer, two General Secretaries, one Local Secretary, and nine other members, who shall collectively constitute the Executive Committee. Three members of this Executive Committee to retire annually by ballot, the remainder being eligible for re-election. They shall be elected at each annual meeting by ballot of those present.

6. At each Conference it shall be determined at what place and time to hold that of the next year.

7. Two members shall be elected by the Conference to audit the Treasurer's accounts, such audited accounts to be presented annually.

8. The Executive Committee shall present a report of proceedings annually.

9. These rules shall not be altered except at an annual meeting of the members.

10. Reports on subjects entrusted to individuals or committees for investigation shall be presented to a future meeting of the Conference, whose property they shall become. All reports shall be presented to the Executive Committee at least fourteen days before the annual meeting.

A list of officers for the ensuing year was then brought forward by Mr. Parkinson, of Bradford. The gentlemen named were unanimously elected, as follows :

President—H. DEANE, F. L. S.

Vice-Presidents—T. Redwood, Ph. D., Sec. C. S., Prof. Bentley, F. L. S., M. R. C. S., J. B. Edwards, Ph. D., F. C. S., R. W. Giles, F. C. S.

Treasurer—H. B. Brady, F. L. S., etc.

General Secretaries—J. Attfield, Ph. D., F. C. S., R. Reynolds, F. C. S.

Local Secretary—J. C. Pooley.

Committee—S. Gale, F. C. S., T. B. Groves, F. C. S., D. Hanbury, F. L. S., A. F. Haselden, B. S. Proctor, W. D. Savage, F. Sutton, F. C. S., J. P. Tylee, E. Wood.

It was decided to hold the next meeting at Bath.

A committee on adulterations was then appointed and requested to report at the next annual meeting. This committee to be Dr. Attfield, T. B. Groves, B. S. Proctor, Mr. Rimmington, and Mr. Sutton.

The persons present then enrolled themselves as members, when the meeting adjourned to 8 o'clock, P. M.

At the evening meeting a paper was read on weights and measures, followed by a discussion of that subject. Some cases of adulterations in drugs were then brought forward which elicited much interest, after which the members adjourned to partake of a supper.

We have read the account of this movement with interest, and earnestly hope it may be the beginning of a series of meetings that will evolve from the heterogeneous elements of British Pharmacy, results of a most gratifying character by furnishing a common ground upon which those elements can approach each other and be influenced for good by a generous spirit of emulation. Its success will, we believe, depend mainly upon the liberal feeling of the better educated class, and the unsparing devotion of time and labor on the part of a few zealous members like Jacob Bell.

We doubt the policy of meeting at the time and place of the British Association, for many reasons. First, the strictly scientific character of that body does not harmonize with such an one as that now initiated. Second, the scientific portion of the pharmacutists will be more strongly attracted to the Association and cannot well serve two masters. Third, the better educated will have to reach down and encourage the less educated to raise themselves towards a better rule of practice, and a strieter code of ethics, all of which can be more effectually done by keeping clear of complicating influences. And, finally, the metropolitan pharmacutists will have to rid themselves of the idea that in Pharmacy London is Great Britain, and gradually acknowledge the fact that good pharmacutists may be found in the "Provinces," who only need scope for their talents to make themselves a name.

THE LATE MEETING OF THE ASSOCIATION.—In the beginning of this number our readers are presented with the Minutes of the late Meeting of the American Pharmaceutical Association. They are full and need no commentary here. The meeting was one of the most successful that has been held. Our Baltimore friends were a unit in their endeavors to make the Meeting succeed, and all passed off well. After the adjournment the mem-

bers were invited to join in an excursion with the pharmacutists down the Chesapeake Bay as far as Annapolis in the steamer Pioneer. The afternoon proved auspicious, the boat comfortable, the company, many of whom were the wives and lady friends of the Baltimore members, were in the best mood to enjoy the occasion, whilst sweet music from time to time was discoursed by a band provided for the excursion. In sailing down the Patuxent the prominent features of the marine approach to Baltimore were all pointed out; not the least interesting of which were the forts which now cover the prominences on either side. Fort McHenry was approached closely, and slowly passed, which afforded a good opportunity to observe the ground and outbuildings. The boat stopped at Fort Carroll, and the company debarked to examine the structure, which is not more than half finished. It will be a work of great strength, and like Fort Sumter stands entirely out in the river which it completely commands. Arrived at Annapolis, the party again debarked and made a hurried visit to the State House, the Naval Hospital and the Governor's house, and soon after our steamer turned her bow to the northward, and returned us safely at our starting point about ten o'clock, P.M. In the interval an excellent supper was provided and served in the cabin. Before parting, Mr. Parrish of Philada., on behalf of the strangers present, thanked the Pharmacutists of Baltimore for their generous hospitality and unremitting kindness, to which Mr. Meakim of New York added a few remarks. None present on that occasion thought that they were the last words he would address to our Association in its collective capacity.

A HINT IN REGARD TO FUNNELS.—Prof. Procter: Sir,—Allow me to bring before your notice (though somewhat out of date at present) a slight improvement in funnels, so trifling, probably, no one thought worth while to mention it. Nevertheless, I think it worth some consideration. All the funnels which I came across, are so made that when you place them in a bottle they get so tight that there is no opening left for the air to escape when the liquid is poured into the bottle. Now what I propose is this: to have funnels made with a groove cut on the outside, which, though simple, would fully remedy the defect of the liquid returning up the outside of the funnel, and going to loss when you are pouring it into the bottle.

A STUDENT OF THE COLLEGE OF PHARMACY.

Phila. Oct. 30th, 1863.

Our correspondent is not the first to experience the inconvenience to which he alludes. It is not unusual in porcelain funnels to notice a groove on the outside of the neck to permit the passage of the displaced air. To make such a groove in glass funnels as at present made, would add materially to their cost, as it would have to be effected by grinding. Possibly the glass blower might make a longitudinal depression on the neck, but there would be a corresponding protuberance within the neck which would be objectionable. Cannot our druggists effect some improvement?

First Outlines of a Dictionary of the Solubilities of Chemical Substances.
By Frank H. Storer. One Volume in Three Parts. Part 2d. Cambridge.
Sever & Francis, 1863.

The second part of this valuable work has been received from the publishers, through J. B. Lippincott & Co., of Philadelphia. It begins with "Convulvulinic Acid," and ends with "Oxide of Tin," making 226 pages, double column. A comparison with the previous number fully bears it out in the comprehensiveness of its grasp, and the extent of information on important substances in relation to solubilities. The author goes more in detail in proportion to the practical or scientific interest that attaches to the substances. The number of organic bodies is very large, and if the book served no other purpose than that of an alphabetical catalogue of chemical substances, it would be of great use. Among the more prominent items of interest to the apothecary may be instanced the following: Creasote, the Cyanides, Dextrine, Digitalin, Essential Oils, Ethyl Compounds, Ferri-cyanides and Ferro-cyanides, Gallic and Gallotannic Acids, Glycerin, Arabin, Gun-cotton, Iodides, Lactic Acid and Lactates, Malic Acid and Malates, Mannite, Nitrates, Oxalic Acid, Oxalates and Oxides. When finished it will form a compend on the subject of solubilities, to be found no where else, and which will address itself particularly to the pharmacist, whose profession involves this quality of substances to a large extent. We offer the following extracts as examples of this number and recommend our readers to get the book.

CREOSOTE. Sparingly soluble in water. Miscible in all proportions with (*Kreosote*.) alcohol, ether, bisulphide of carbon, naphtha, eupion, acetic ether, and acetic acid of 1.07 sp. gr. It is only partially soluble in ordinary acetic acid. (*Gorup-Besanez*.) When pure, it is entirely soluble in ordinary acetic acid. (*Völckel*.) Soluble in sulphuric acid, with combination. No more soluble in dilute chlorhydric acid than in water. Soluble in 80 pts. of cold, and 24 pts. of hot water.

Soluble in 80 pts. of water at 18.75°. (*Abl. from Österr. Zeitschrift für Pharm.*, 8, 201, in *Canstatt's Jahresbericht, für 1854*, p. 75.) Creosote dissolves, especially when warm, phosphorus, sulphur, selenium; oxalic, tartaric, citric, boracic, and stearic acids; the fats, resins, and coloring matters (as cochineal, dragon's-blood, santal red, santal-yellow, orchil, madder-red, and saffron). When warm, it dissolves indigo. When hot, it dissolves many salts, which separate out again as the solution cools; for example, many acetates and chlorides.

OIL OF TURPENTINE. Almost entirely insoluble in water. Soluble in all (*Spirits of Turpentine*.) proportions in absolute alcohol; and in 12 pts. of alcohol of 0.858 sp. gr., at 10° (*Blanchet & Sell*); in 7.4 pts. of alcohol, of 0.84 sp. gr., at 22° (*Saussure*); in 4 vols. alcohol, of 0.83 sp. gr., in 5 vols. alcohol. (*Audnard*.) 5 vols. oil of turpentine are miscible with 1 vol. of alcohol, and the mixture is not clouded by water, the water only slowly removing the alcohol. (*Vauquelin*.) Does not dissolve well in alcohol unless this be free from water; 100 pts. of alcohol, of 0.84 sp. gr. dissolve 13.5 pts. of it at 16.6° [T.] Soluble in strong alcohol, in benzin, and in strong wood-spirit. After alcohol or wood-spirit have been so much diluted with water that they can no longer dissolve oil of turpentine, the addition of some benzin restores their solvent power. Far more readily soluble in ace-

tone than in ordinary alcohol. (Mansfield, *J. Ch. Soc.*, 1. 263.) Soluble in wood spirit in all proportions, the solution being rendered turbid on the addition of water. (Gmelin.) Soluble in alcohol, ether, and glacial acetic acid. (Berthelot, *Ann. Ch. et Phys.*, (3.) 37. 225.) Insoluble in glacial acetic acid. (Deville.) Soluble in most of the volatile oils. Miscible with bisulphide of carbon (Lampadius), with chloroform (Haurant & Laroque) and the fatty oils (Wittstein's *Handb.*) Easily soluble in ether. (*lb.*) Soluble in most of the volatile oils. (Bracconot.) Its solubility in alcohol is not increased, but, on the contrary, somewhat diminished, by the presence of nitric acid. (Deville, *Ann. Ch. et Phys.*, (3.) 27. 82). Decomposed by concentrated mineral acids. Soluble in acetate of ethyl, butyric acid, and fusel oil. (Berthelot, *Gm.*, 14. 258.)

GLYCERIN. Hygroscopic. Miscible in all proportions with water and alcohol. Insoluble in ether. (Hydrated Oxide of Glycerin or of Lipp.) Soluble in water. Also soluble in absolute alcohol, from which it is partially precipitated on the addition of an equal volume of ether. (Berthelot, *Ann. Ch. et Phys.*, (3.) 43. 262.) A small quantity of ether does not precipitate glycerin from its alcoholic solution, although it is insoluble in ether alone. (Wurtz.) Glycerin is not miscible with the fatty oils. (Parrish's *Pharm.*, p. 324.) Soluble in cold fuming chlorhydric acid.

An aqueous solution of sp. gr. (at 17.5°)	Contains per cent of glycerin of 1.26 sp. gr.*	Freezes at °C.
1.034	10	—1.25°
1.051	20	—2.5°
1.075	30	—6.25°
1.105	40	—17.5°
1.117	45	—26.25°
1.127	50	—31.25°@ [33.75°
1.159	60 }	Not freezing at —35°
1.179	70 }	
1.1204	80 }	
1.232	90 }	
1.241	100 }	

(Fabian, *Dingler's polyt. Journ.*, 1860, 155. 347.

Glycerin approaches very nearly to diluted alcohol in its solvent power. It dissolves all deliquescent salts, several metallic nitrates, chlorides, and sulphates, the alkalies, and several of the metallic oxides, as oxide of lead, in large quantities; it also dissolves many vegetable acids. (Pelouze.)

The solvent power of glycerin is between that of water and of alcohol. In general terms, substances may be said to be more soluble in glycerin the more soluble they are in alcohol. A high temperature greatly increases its solvent power (Parrish's *Pharm.*, p. 236.) Most of the GLYCERIDES are insoluble, or but sparingly soluble in water. The compounds of glycerin with *baryta*, *lime*, [see Oxide of Calcium], and *strontia*, are soluble in water, from which carbonic acid does not precipitate them: they are also sparingly soluble in alcohol. (Chevreul)

GUTTA PERCHA Insoluble in water or alcohol. Soluble in ether, caoutchou, and coal-tar naphtha (Page, *Am. J. Sci.*, (2) 4. 342) Insoluble in boiling alcohol. Readily soluble in boiling oil of turpentine. Soluble in naphtha and in coal-tar. (Oxley, *Am. J. Sci.*, (2.) 5, 440.) Soluble in benzin. (Mansfield *J. Ch. Soc.*, 1. 251. Insoluble in water, alcohol, oils, alkaline solutions, or in chlorhydric or acetic acids. It softens and partially dissolves in ether, essential oils, and coal-tar naphtha. Its best solvent is oil of turpentine. Con-

* According to Fergusson Wilson, a sample of 1.26 sp. gr. contains 98 per cent of anhydrous glycerin.

concentrated sulphuric acid slowly chars it; concentrated nitric acid also gradually oxidizes it (Solly, *Rep. Br. Assoc.*, 1845, 32.)

Soluble in pure chloroform, in bisulphide of carbon, in rectified oils of turpentine, resin, gutta-percha, and tar; also in terebene, chlorhydrate of terebene, and, slightly, in pure ether. Of these solvents, the two first mentioned are the best, and dissolve the gutta-percha at low temperatures. The other solvents act only at temperatures above 21° , and when the solutions obtained are cooled much below 16° , the gutta-percha is deposited as a granular mass. The length of time required to produce this precipitate depends upon the degree of cold; sometimes it requires several days, at others the exposure of an hour suffices to produce it. From its solutions in chloroform and bisulphide of carbon, the gum may be recovered in its natural state either by evaporating or by precipitating it with alcohol. But when any of the hydrocarbons are used as solvents, a portion is retained with such tenacity that it cannot be removed without decomposing the gum. Solutions of gutta-percha are precipitated by alcohol. Ether also precipitates it from the solution in chloroform. Crude gutta-percha contains a small portion of a soft yellow resin, soluble in alcohol, ether, and oil of turpentine. (Kent, *Am. J. Sci.* (2.) 6 246.)

Insoluble in dilute alcohol; traces of it are dissolved by strong alcohol. Only about 0.15@ 0.22 p. c. of it is soluble in hot alcohol or ether (anhydrous). Soluble in cold bisulphide of carbon, and chloroform. Sparingly soluble in warm, insoluble in cold olive-oil. Partially soluble in cold, almost entirely soluble in hot benzin, and oil of turpentine. Unacted upon by solutions of the caustic alkalis, ammonia-water, saline solutions, carbonic acid water, or the various vegetable, and dilute mineral, acids. Unacted upon by fluorhydric acid, it is attacked by concentrated sulphuric, chlorhydric, and nitric acids. (Gerhardt's *Tr.*)

Payen finds in gutta-percha several resins [see under Resins], and

Pure Gutta: which is insoluble in alcohol or ether. Soluble in cold chloroform, and bisulphide of carbon; and in warm benzin, and oil of turpentine.

Synopsis of the course of Lectures on Materia Medica and Pharmacy delivered in the University of Pennsylvania; with three Lectures on the Modus Operandi of Medicines. By Joseph Carson, M.D. Third Edition revised. Philadelphia. Blanchard & Lea. 1863. pp. 244. Octavo.

We acknowledge the receipt of this volume from the publishers; it is a valuable help to the student of Materia Medica at the University. It is elegantly gotten up in regard to paper and type. Dr. Carson's class, which is understood to be unusually large, will be gratified with the opportune appearance of this useful volume.

OBITUARY.—The newspapers of Monday, the 19th of October, briefly announced the sudden death of JOHN MEAKIM on the previous morning. It startled and grieved many friends—for his friends were all who knew him. Few, that they had known, had fulfilled the appointed duties of life so well, and had enlisted such general good will, with so little cause of reproach.

He early applied himself to the study of pharmacy; was an earnest, industrious student, and graduated in the New York College, with much credit, in 1836. His youth was promising; his manhood exceeded the

promise. He became a member of the College in 1839; was elected Secretary in 1842; Vice President in 1851; and President in 1854. From 1842, he was constantly a member of the Board of Trustees; either ex-officio or by election as Trustee. As Secretary, five years, he was remarkable for the neatness and method with which the details of his office were executed; as Vice President three years, and President, seven years he filled each position with eminent ability and general approval. As a member of the Board, he was always amongst the most attentive, useful and efficient; being as a committee-man so active and reliable, that he was constantly in requisition.

But in the shop was his chief honor. Faithful among the faithless, true to his trust where so few meet its exactions, he dignified the drudgery and weariness of the most arduous, self-immolating, ill-appreciated and ill-requited of professions. His uncompromising aversion to quackery and his refusal to contaminate himself with it were as rare as they were noble.

He exhibited extraordinary neatness and good taste in the fixtures, apparatus, and arrangement of his business; and these were appropriate incidents to the skill, and care, and scrupulous honesty, with which he dispensed medicines: faithfulness to duty, because it was duty, being evidently his first consideration. He fell at his post. While dispensing a prescription on Saturday evening, the measure dropped from his hand; he was found to be paralyzed on the left side; and though he did not, himself, apprehend the result, but spoke cheerfully in regard to it, he was carried home to survive but a few hours. Cut down in the midst of his usefulness, at the height of his fame, he has left but too few to sustain the character of which he was so fair an example. At a meeting of the College of Pharmacy of the city of New York, together with the members of the American Pharmaceutical Association resident in this city, previous to the funeral on the 21st inst., the following preamble and resolutions were unanimously adopted.

Whereas, by the dispensation of an overruling Providence, our associate and friend, John Meakim, has been suddenly taken from us, and we have met to testify our sorrow and respect, it is

Resolved, That in his several relations to the College of Pharmacy, as Student, Graduate, Member, Trustee, Secretary, Vice-President and President, he has ever endeared himself to his associates, by his earnest, generous and genial character, by his unremitted zeal, and the devotion of his fine talents to promote its objects, and increase its usefulness.

Resolved, That, standing as he did, by general consent in the foremost rank of pharmacutists in this city, he ennobled our profession by his high-toned code of ethics; his excellent taste; his scorn of all the arts and gains of charlatantry; his honest, unselfish and faithful performance of duty,—faithful even unto death: and has left us an example worthy of our emulation.

Resolved, That we tender our sincere sympathy to his bereaved family; and that a copy of these resolutions, properly attested, be presented to them.

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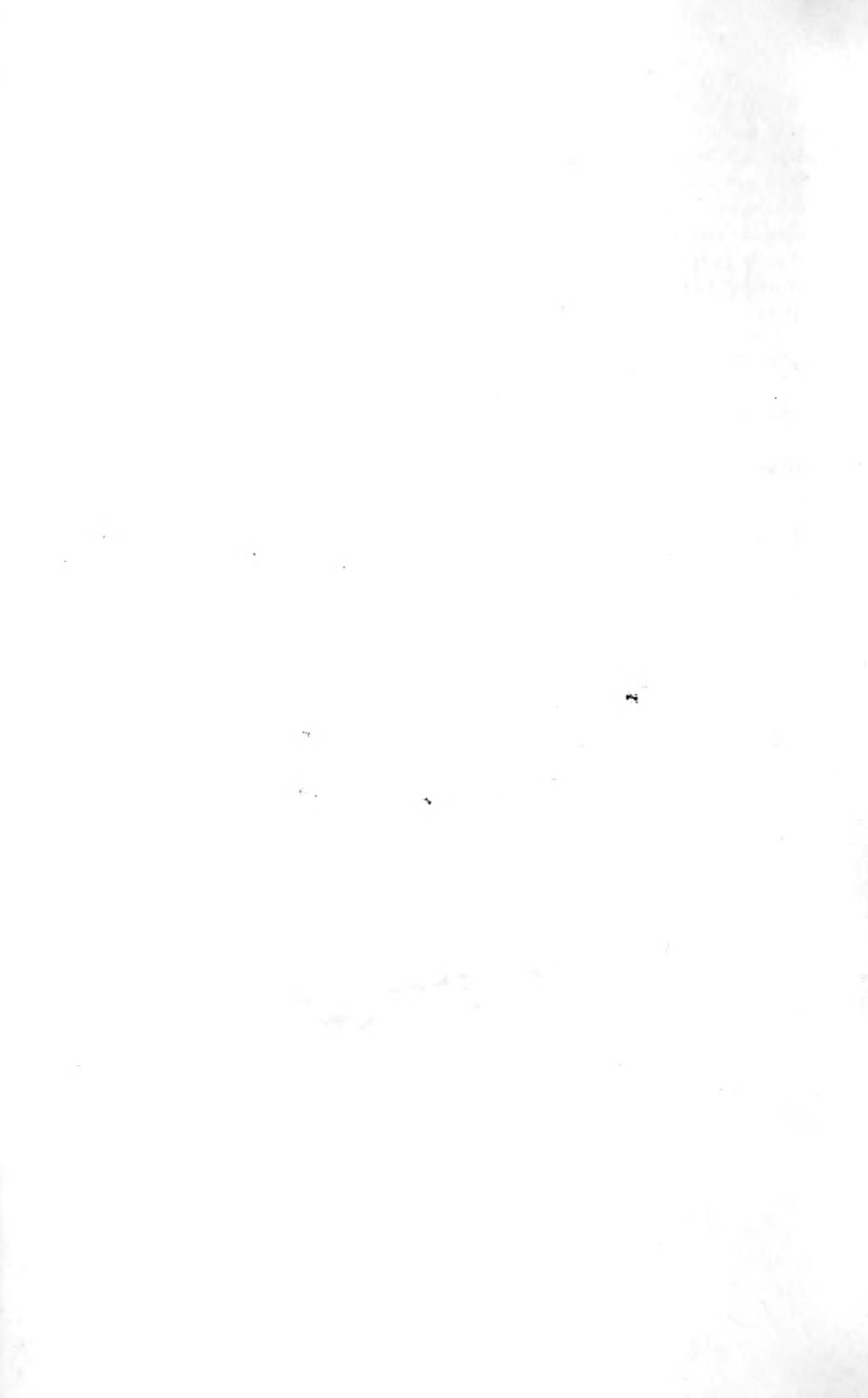
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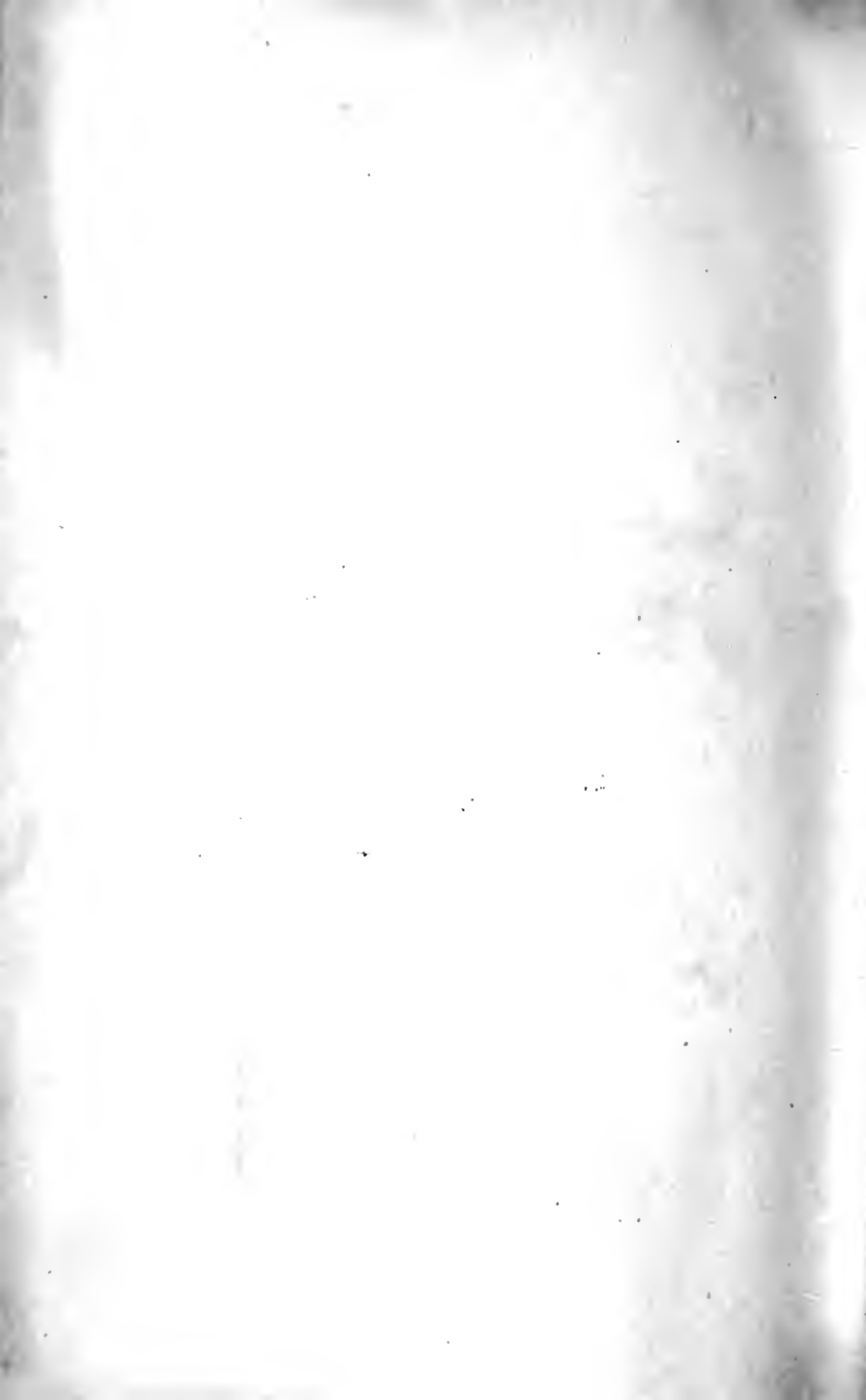
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